

# UTILITY PATENT APPLICATION TRANSMITTAL

## (Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.  
5269

Total Pages in this Submission  
3

### TO THE ASSISTANT COMMISSIONER FOR PATENTS

Box Patent Application  
Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

**VIRTUAL ON-DEMAND ELECTRONIC BOOK**

and invented by:

John S. HENDRICKS et al.

If a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:

Continuation  Divisional  Continuation-in-part (CIP) of prior application No.: 08/336,247; and  
08/160,194; and 08/906,469, which (the last identified application) is a

Continuation  Divisional  Continuation-in-part (CIP) of prior application No.: 08/160,281; and  
09/237,828; and 09/237,827; and 09/289,958; and 09/289,957; and 09/289,956.

Continuation  Divisional  Continuation-in-part (CIP) of prior application No.: \_\_\_\_\_

Enclosed are:

### Application Elements

1.  Filing fee as calculated and transmitted as described below
2.  Specification having 104 pages and including the following:
  - a.  Descriptive Title of the Invention
  - b.  Cross References to Related Applications (*if applicable*)
  - c.  Statement Regarding Federally-sponsored Research/Development (*if applicable*)
  - d.  Reference to Microfiche Appendix (*if applicable*)
  - e.  Background of the Invention
  - f.  Brief Summary of the Invention
  - g.  Brief Description of the Drawings (*if drawings filed*)
  - h.  Detailed Description
  - i.  Claim(s) as Classified Below
  - j.  Abstract of the Disclosure

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**Application Elements (Continued)**

3.  Drawing(s) *(when necessary as prescribed by 35 USC 113)*
  - a.  Formal Number of Sheets 53
  - b.  Informal Number of Sheets \_\_\_\_\_
4.  Oath or Declaration
  - a.  Newly executed *(original or copy)*  Unexecuted
  - b.  Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional application only)*
  - c.  With Power of Attorney  Without Power of Attorney
  - d.  **DELETION OF INVENTOR(S)**  
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5.  Incorporation By Reference *(usable if Box 4b is checked)*  
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6.  Computer Program in Microfiche *(Appendix)*
7.  Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all must be included)*
  - a.  Paper Copy
  - b.  Computer Readable Copy *(identical to computer copy)*
  - c.  Statement Verifying Identical Paper and Computer Readable Copy

**Accompanying Application Parts**

8.  Assignment Papers *(cover sheet & document(s))*
9.  37 CFR 3.73(B) Statement *(when there is an assignee)*
10.  English Translation Document *(if applicable)*
11.  Information Disclosure Statement/PTO-1449  Copies of IDS Citations
12.  Preliminary Amendment
13.  Acknowledgment postcard
14.  Certificate of Mailing  
 First Class  Express Mail *(Specify Label No.):* \_\_\_\_\_

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**Accompanying Application Parts (Continued)**

15.  Certified Copy of Priority Document(s) (*if foreign priority is claimed*)

16.  Additional Enclosures (*please identify below*):

**Fee Calculation and Transmittal**

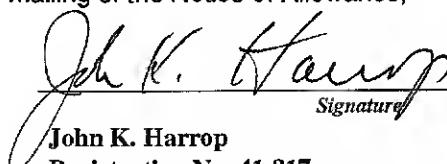
**CLAIMS AS FILED**

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	79	- 20 =	59	x \$18.00	\$1,062.00
Indep. Claims	7	- 3 =	4	x \$78.00	\$312.00
Multiple Dependent Claims (check if applicable)	<input type="checkbox"/>				\$0.00
				<b>BASIC FEE</b>	<b>\$760.00</b>
<b>OTHER FEE (specify purpose)</b>					<b>\$0.00</b>
				<b>TOTAL FILING FEE</b>	<b>\$2,134.00</b>

A check in the amount of **\$2,134.00** to cover the filing fee is enclosed.

The Commissioner is hereby authorized to charge and credit Deposit Account No. **04-1425** as described below. A duplicate copy of this sheet is enclosed.

- Charge the amount of \_\_\_\_\_ as filing fee.
- Credit any overpayment.
- Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

  
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Dated: **October 17, 1999**

cc:

## **VIRTUAL ON-DEMAND ELECTRONIC BOOK**

### Related Applications

This application is a continuation-in-part of U.S. Application Serial No. 08/336,247 entitled ELECTRONIC BOOK SELECTION AND DELIVERY SYSTEM, filed November 7, 1994, and U.S. Application Serial No. 08/160,194, entitled ADVANCED SET-TOP TERMINAL FOR CABLE TELEVISION DELIVERY SYSTEMS, filed December 2, 1993, and U.S. Application Serial No. 08/906,469, entitled REPROGRAMMABLE TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON A TELEVISION PROGRAM DELIVERY SYSTEM, filed August 5, 1997 which is a continuation of U.S. Application Serial No. 08/160,281, entitled TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON A TELEVISION PROGRAM DELIVERY SYSTEM, filed December 2, 1993, which is now U.S. Patent No. 5,798,785, dated August 25, 1998, U.S. Application Serial No. 09/237,828, filed on January 27, 1999, entitled ELECTRONIC BOOK ELECTRONIC LINKS, and U.S. Application Serial No. 09/237,827, filed on January 27, 1999, entitled ELECTRONIC BOOK HAVING LIBRARY CATALOG MENU AND SEARCHING FEATURES, U.S. Application Serial No. 09/289,958, filed on April 13, 1999, entitled INTERACTIVE ELECTRONIC BOOK, U.S. Application Serial No. 09/289,957, filed on April 13, 1999, entitled ELECTRONIC BOOK ALTERNATIVE DELIVERY SYSTEMS, and U.S. Application Serial No. 09/289,956, filed on April 13, 1999, entitled ELECTRONIC BOOK ALTERNATIVE DELIVERY METHODS. This application is also related to co-pending application filed together herewith entitled METHOD FOR VIRTUAL ON-DEMAND ELECTRONIC BOOK. These patents and applications are incorporated by reference herein.

## Technical Field

This invention is directed to on-demand delivery of electronic books. More specifically, the invention is a virtual on-demand electronic book delivery system and method.

1 typeset printing has the world stood on the brink of such a revolution in the distribution  
2 of text material. The definition of the word "book" will change drastically in the near  
3 future. Due to reasons such as security, convenience, cost, and other technical problems,  
4 book and magazine publishers are currently only able to distribute their products in paper  
5 form. This invention solves the problems encountered by publishers.

6 Summary Of Invention

7 An electronic book selection and delivery system is a new way to distribute  
8 electronic books to bookstores, public libraries, schools and subscribers. The  
9 technological breakthroughs of this invention provide a secure system for both delivering  
10 selected electronic books and receiving payments. The system has an unusual  
11 combination of features that provides the subscriber with an electronic book viewer that  
12 has a high tech aura while being very practical, portable, and easy to use.

13 The clear advantage of the system is that it eliminates the distribution of a  
14 physical object such as a paper book from a book or text distribution system. The  
15 purchase of an electronic book may become a PAY-PER-READ™ event, avoiding the  
16 overhead, "middle-men," printing costs, and time delay associated with the current book  
17 distribution system. Published material and text such as the President's speech, a new  
18 law, a court decision on abortion, or O.J. Simpson's testimony can be made immediately  
19 available to the subscriber at a nominal fee.

20 The system is a novel combination of new technology involving the television,  
21 cable, telephone, and computer industries. The system uses high bandwidth data  
22 transmissions, strong security measures, sophisticated digital switching, high resolution  
23 visual displays, novel controls, and subscriber-friendly interface software.

24 The primary components of the system are the subsystem for placing the text onto  
25 a signal path and the subsystem for receiving and selecting text that was placed on the  
26 signal path. An embodiment of the system includes additional components and optional  
27 features that enhance the system. The system may be configured for use by bookstores,  
28 public libraries, schools and subscribers.

1           The system for subscriber use is made up of four subsystems, namely: (1) an  
2 operations center, (2) a distribution system, (3) a home system including reception,  
3 selection, viewing, transacting and transmission capabilities, and (4) a billing and  
4 collection system.

5           The operations center performs several primary functions: manipulating text data  
6 (including receiving, formatting and storing of text data), security encoding of text,  
7 cataloging of books, providing a messaging center capability, and performing uplink  
8 functions. The system delivers the text from the operations center to subscriber homes  
9 by inserting text data into an appropriate signal path. In an embodiment, insertion of text  
10 is generally performed with an encoder at an uplink site that is within or near the  
11 operations center. If the signal path is a video signal path, the system can use several  
12 lines of the Vertical Blanking Interval (VBI), all the lines of the analog video signal, a  
13 digital video signal or unused portions of bandwidth to transmit text data. Using the VBI  
14 delivery method, the top ten or twenty book titles may be transmitted with video during  
15 normal programming utilizing existing cable, satellite, wireless or broadcast transmission  
16 capability without disruption to the subscriber's video reception. Using the entire video  
17 signal, thousands of books may be transmitted within just one hour of air time. Nearly  
18 any analog or digital video distribution system may be used to deliver the video signal  
19 with included text. The operations center may also use the Internet for delivery of  
20 electronic books. Such an operations center may include one or more web servers,  
21 delivery servers and transaction servers. The servers may be co-located, or may be linked  
22 by a high speed network, including the Internet.

23           The text data may also be transmitted over other low and high speed signal paths  
24 including a telephone network (e.g., a public switched telephone network) having a high  
25 speed connection such as a digital subscriber line (DSL) connection.

26           The home system performs four primary functions: connecting to the video  
27 distribution system, selecting text, storing text, and transacting through a phone or cable  
28 communicating mechanism. The components of the home system may be configured in

1 a variety of hardware configurations. Each function may be performed by a separate  
2 component, the components may be integrated, or the capability of existing cable set top  
3 terminals and televisions may be utilized. A connector, library unit and an electronic  
4 book viewer unit are used in one embodiment. In another embodiment, all the functions  
5 of the home system are included in the single viewer unit. The connector portion of the  
6 home system receives the electronic book signal and strips or extracts the text from the  
7 signal. The library stores the text signal, provides a subscriber-friendly software interface  
8 to the system and processes the transactions at the subscriber's home. The viewer  
9 provides a screen for viewing text or menus and novel subscriber-friendly controls.

10 The viewer may be a portable book-shaped device that stores one or more  
11 electronic books for viewing and provides a screen for interacting with the library. A  
12 high resolution LCD display is used to both read the books and to interact with the library  
13 software. An optional phone connector or return-path cable connection initiates the  
14 telephone calls and, with the aid of the library, transmits the necessary data to complete  
15 the ordering and billing portion of the subscriber transaction. The subscriber-friendly  
16 controls include a bookmark, current book and page turn button. The billing and  
17 collection system performs transaction management, authorizations, collections and  
18 publisher payments automatically utilizing the telephone system.

19 True "on demand" electronic book delivery systems require infrastructure  
20 designed and sized for worst-case peak demand service. For example, in the case of an  
21 on-demand electronic book service, the infrastructure would have to be designed to  
22 support concurrent downloading of content to the maximum number of subscribers all  
23 accessing and attempting to download electronic book content at the same time. In  
24 practice, both statistical and historical data are used to limit the design infrastructure  
25 because there is a low probability that all subscribers will actually demand service at the  
26 same time. In this case, the design can allow for a grade of service that will block access  
27 to some subscribers with a low probability of occurrence. As an example, assume a  
28 service with 1000 subscribers, where statistical and historical data indicate that the

1 probability of having more than 100 simultaneous subscribers at any time is 0.01. The  
2 system can be designed with a 99% grade of service (i.e., at peak time, a subscriber has  
3 a 99% chance of receiving on-demand service) by an infrastructure that supports  
4 simultaneous downloading of content to 100 subscribers.

5 However, even with these design approaches, there are two fundamental  
6 problems:

7 Systems and infrastructure must be designed to support a particular grade of  
8 service at the busiest time of use, and

9 Subscribers will not receive on demand service if the design grade of service  
10 loading is exceeded.

11 The subject invention eliminates both of these problems, and allows for  
12 implementation of economic and efficient infrastructures. Further, the invention provides  
13 for increased ease of use by electronic book subscribers and increased promotional,  
14 marketing and sales opportunities for electronic book content suppliers.

15 The invention is entitled "virtual" books on demand because from the perspective  
16 of book subscribers, the service appears to be true on-demand, while from the perspective  
17 of system and infrastructure design, efficiencies in service can be obtained because the  
18 downloading of content does not have to be on-demand.

19 The electronic book-on-demand system includes mechanisms for broadcasting  
20 content from centralized sources to electronic book home systems. The general approach  
21 to broadcasting content has two fundamental concepts. First, popular content is broadcast  
22 on a cyclical basis and is available to multiple subscribers at any given time. Popular  
23 content may be content that is requested by a large number of subscribers or is promoted  
24 heavily by content providers. Second, less-popular content is transmitted upon specific  
25 request by subscribers. For example, a New York Times "best seller" may be transmitted  
26 cyclically while an obscure classroom textbook may be transmitted only on request by a  
27 specific subscriber. In this model, content can be viewed as a queuing model, where the  
28 broadcast medium (or media) services the queued content elements. As with any queued

1 system, there are queuing delays from the time an element is requested until the item can  
2 be sent. These delays are variable, based on the number of items queued and the number  
3 of concurrent or overlapping requests to queue new content. As such, during non-busy  
4 times, requests for specific content are likely to be serviced on-demand, that is, there will  
5 be a very small delay due to queuing. However, with traditional approaches at busy times  
6 the delay may be substantial, and the service may not be able to meet the subscriber's  
7 expectation of on-demand service.

8 By moving the content from a central broadcast point to the electronic book or  
9 local library system, the electronic book-on-demand system can avoid the queuing delay  
10 problem. For example, if a subscriber's electronic book was downloaded with all of the  
11 popular content, the subscribers would have true on-demand access to this content  
12 without the need to download the content upon the subscriber's request. Although this  
13 approach works well from the subscriber's perspective, it is unreasonably inefficient in  
14 the use of extensive storage media in the book.

15 However, if the book unit contained the first "n" pages of content from each  
16 popular book (the "First Section" rather than the entire book) the subscriber could begin  
17 accessing the content immediately, while the remaining content is queued for  
18 transmission (or captured as a cyclical transmission of the electronic book) based on the  
19 subscriber's interest in this content.

20 The invention includes this approach of broadcasting the first section of multiple  
21 content elements, storage of these sections in the viewer or library unit, and subsequent  
22 queuing and reduced cyclical broadcasting of content in a background mode rather than  
23 an on-demand mode. True on-demand broadcasts then may be reserved for the first  
24 sections of less-popular (i.e., content that does not warrant any cyclical broadcasting)  
25 content specifically requested on-demand by system subscribers.

26 **Brief Description Of Drawings**

27 The invention will be described with reference to the following drawings, wherein  
28 like numerals refer to like elements, and wherein:

1           Figure 1 is a block diagram of the primary components of the electronic book  
2 selection and delivery system;

3           Figure 2 is a schematic showing an overview of the electronic book selection and  
4 delivery system;

5           Figure 3a is a schematic of the delivery plan for the electronic book selection and  
6 delivery system;

7           Figure 3b is a schematic of an alternate delivery plan;

8           Figure 4 is a block diagram of an operations center;

9           Figure 5a is a flow diagram of the processing at the operations center;

10           Figure 5b is a block diagram of the hardware configuration for an uplink site;

11           Figure 6a is a block diagram of the hardware configuration for a multiple  
12 component home system;

13           Figure 6b is a schematic of a two-unit home system;

14           Figure 7 is a flow diagram of the processes performed by a connector;

15           Figure 8 is a block diagram for an example of a library;

16           Figure 9 is a flow diagram of some of the processes performed by the library on  
17 the received data stream;

18           Figure 10 is a flow diagram of the processes performed by the library on  
19 information requests from the viewer;

20           Figure 11 is a block diagram showing the components for an example of a viewer;

21           Figure 12 is a flow diagram of some of the processes performed by the viewer on  
22 an information request from a subscriber;

23           Figure 13 is a chart depicting the menu structure and sequencing of menus in the  
24 menu system;

25           Figure 14a is a schematic of an introductory menu;

26           Figure 14b is a schematic showing an example of a main menu;

27           Figures 14c, 14d, 14e, 14f, 14g, 14h, 14i, 14j and 14k are schematics showing  
28 examples of submenus;

1           Figures 15a and 15b are diagrams of an electronic book system for a bookstore,  
2 or school or public library;

3           Figures 16a and 16b are schematics of hardware modifications or upgrades to a  
4 set top terminal;

5           Figure 17 is a schematic showing a set top terminal that includes a data receiver  
6 and data transmitter;

7           Figure 18a is a schematic of a book-on-demand system;

8           Figure 18b is a schematic of an operations center supporting a book-on-demand  
9 system;

10          Figure 19a shows an example of processing routines used with the book-on-  
11 demand system of Figures 18a and 18b;

12          Figure 19b shows a decision tree for the processing routines of Figure 19a;

13          Figures 20a - 20e are block diagrams of alternative book-on-demand system;

14          Figure 21a is a block diagram of an alternative book-on-demand system;

15          Figure 21b is a diagram of a state machine for the system of Figure 21a;

16          Figure 22a is a block diagram of an alternative book-on-demand system;

17          Figure 22b is a diagram of a state machine for the system of Figure 22a;

18          Figures 23a and 23b are block diagrams of alternate virtual book-on-demand  
19 systems;

20          Figures 24a and 24b are block diagrams of another virtual book-on-demand  
21 system;

22          Figure 25 is a block diagram of the processing performed by the system of Figure  
23 24b;

24          Figure 26 is a schematic of a page of an electronic book having electronic links;

25          Figure 27 is a schematic of a page of an electronic book with the electronic links  
26 shown;

27          Figure 28 is a schematic of a show links submenu; and

28          Figure 29 is an example of links in an electronic book.

1           Disclosure Of Invention

2           Figure 1 shows an embodiment of an electronic book selection and delivery  
3           system 200. The components of the electronic book selection and delivery system 200  
4           are an encoder 204, a distribution system 208, a connector 212, and a text selector 216.  
5           Electronic book "text" may also include any electronic book content including video,  
6           audio or graphics. The system 200 may use a video signal, for example, to distribute  
7           electronic books. In this example, the encoder 204 places textual data on a video signal  
8           to form a composite video signal. The composite video signal may be an analog or a  
9           digital signal. Although the composite signal may contain only textual data, it also may  
10           carry both video and textual data. A variety of equipment and methods may be used to  
11           encode text data onto a video signal. The distribution system 208 distributes the  
12           composite video signal from the single point of the encoder 204 to multiple locations  
13           which have connectors 212. The connector 212 receives the digital or analog video  
14           signal from the distribution system 208 and separates, strips or extracts the text data from  
15           the composite video signal. If necessary, the extracted text data is converted into a digital  
16           bit stream. Text selector 216 works in connection with the connector 212 to select text.

17           Using a connector 212 and text selector 216 combination, various methods of  
18           selecting and retrieving desired text from the composite video signal are possible. Text  
19           may be preselected, selected as received or selected after being received and stored. In  
20           a method the connector 212 strips or extracts all the text from the composite video signal  
21           and the text selector 216 screens all the text as received from the connector 212. The text  
22           selector 216 only stores text in long term or permanent memory if the text passes a  
23           screening process described below.

24           An overview of the delivery system 200 is shown in Figure 2. The delivery  
25           system 200 includes: an operations center 250 including an uplink site 254, the  
26           distribution system 208, a home system 258 including the connector 212, a library 262,  
27           a viewer 266, and a connector 270, telecommunications system 274, Internet web sites  
28           279 and 279', an intranet 281, and a billing and collection system 278. Also as shown in

1       Figure 2, the home system 258 may include connections to a television 259 and a  
2       personal computer 261. The television 259 and the personal computer 261 may be used  
3       to display menu screens, electronic books, electronic files, or any other information  
4       associated with the delivery system 200. In addition, the television 259 and the personal  
5       computer 261 may provide control functions that replicate and supplement those of the  
6       viewer 266 and the library 262.

7       The operations center 250 receives textual material from outside sources, or  
8       content providers 282, such as publishers, newspapers, and on-line services. Alternately,  
9       the outside sources 282 may maintain electronic books at the Internet web site 279. The  
10      outside sources 282 may convert textual and graphical material to digital formats, or may  
11      contract with another vendor to provide this service. The operations center 250 may  
12      receive the textual and graphical material in various digital formats and may convert the  
13      textual material to a standard compressed format for storage. In so doing, the operations  
14      center 250 may create a pool of textual material that is available to be delivered to the  
15      home system 258. The textual material may be grouped by books or titles for easy  
16      access.

17      As used herein, "book" means textual or graphical information such as contained  
18      in any novels, encyclopedias, articles, magazines, newspapers, periodicals, catalogs or  
19      manuals. The term "title" may represent the actual title assigned by an author to a book,  
20      or any other designation indicating a particular group, portion, or category of textual  
21      information. The title may refer to a series of related textual information, a grouping of  
22      textual information, or a portion of textual data. For example, "Latest Harlequin  
23      Romance," "Four Child Reading Books (Ages 10-12)," "Encyclopedia  
24      'BRITANNICA'™," "President's Speech," "Instruction Manual," "Schedule of 4th of  
25      July Events," "Pet Handbooks," "Roe v. Wade," and "The Joy of Cooking" are suitable  
26      titles. Also, the title may be a graphical symbol or icon. Thus, a picture of a wrench may  
27      be a title for a repair book, a picture of a computer a title for a computer book, a graphical  
28      symbol of a telephone a title for a telephone book, a drawing of a dagger a title for a

1 mystery book, a picture of a bat and ball a title for a sports book and a picture of  
2 tickertape a title for a business book. The term "electronic book" refers to the electronic  
3 counterpart to a book, i.e., an electronic file. The electronic book may include any  
4 content including text, video, audio, and graphics. The term "an interactive electronic  
5 book" refers to a book-counterpart electronic file with interactive features.

6 In an embodiment, the operations center 250 includes an uplink site 254 for  
7 placing the text onto a video signal and sending the composite video signal into a video  
8 distribution system. The uplink site 254 may include the encoder 204 (not shown in  
9 Figure 2) to encode the text onto the video signal.

10 Many analog and digital distribution systems 208, or other telecommunications  
11 systems, can be used with the delivery system 200, such as a cable television distribution  
12 system, a broadcast television distribution system, video distributed over telephone  
13 systems, distribution from the Internet, direct satellite broadcast distribution systems, and  
14 other wired and wireless distribution systems.

15 The home system 258 performs five primary functions: (1) connecting with the  
16 distribution system 208, (2) selecting data, (3) storing data, (4) displaying data, and (5)  
17 handling transactions. An optional function of the home system 258 is communicating  
18 using the telecommunications system 274. The home system 258 is made up of primarily  
19 four parts: the connector 212 or similar type of connector for connecting with the  
20 distribution system 208, the library unit 262 for storing and processing, the viewer 266,  
21 for viewing and manipulating menus and electronic books, and the connector 270 for  
22 connecting the telecommunications system 274. In an alternate arrangement, the viewer  
23 266 may include all the functionality and components of the home system 258.

24 The billing and collection system 278 may be co-located with the operations  
25 center 250 or located remote from the operations center 250. The billing and collection  
26 system 278 may communicate with the home system 258 using the telecommunications  
27 system 274, for example. Any of a number of telecommunication systems, such as a  
28 cellular system, will operate with the billing and collection system 278. The billing and

1 collection system 278 records data related to the electronic books or portions of text that  
2 are selected or ordered by the subscriber. The billing and collection system 278 may  
3 charge a subscriber's credit account or bill the subscriber. In addition, the billing and  
4 collection system 278 may monitor the amount due to publishers or other outside sources  
5 282 who have provided textual data or other services such as air time to enable the  
6 delivery system 200 to operate.

7 When electronic books are provided via the Internet web site 279, the billing and  
8 collecting functions may be incorporated into the Internet web site 279. For example, a  
9 subscriber may pay for an electronic book selection by entering a credit card number into  
10 a data field of a page of the Internet web site 279. In this configuration, a separate billing  
11 and collection system may not be required.

12 The Internet web site 279' may be used in conjunction with the home system 258  
13 to provide additional functionality. For example, the Internet web site 279' may be a  
14 college professor's Internet web site that is used to post examinations for use with an  
15 interactive electronic book, and at which the students may post completed examinations,  
16 for example. The Internet web site 279' may also be a chat room, bulletin board, or news  
17 group site that is used to communicate information related to one or more electronic  
18 books.

19 The intranet 281 may be a local network linking together a number of related  
20 subscribers. For example, a university may establish an intranet for its students.  
21 Connections may be provided in dormitory rooms, or through use of an interface device  
22 for off-campus students. The intranet 281 may include a connection to the university's  
23 library so that electronic books maintained by the university may be provided to the  
24 students. The intranet 281 may also include web sites for the university's professors,  
25 similar to the Internet web site 279'. In this case, all the functionality of the Internet web  
26 site 279' would be included in the web sites in the intranet 281.

27 Figure 3a is an expanded overview of a delivery plan 301 for the delivery system  
28 200. The delivery plan 301 supports various types of subscribers and various billing

1 systems. Figure 3a shows that publishers 282 will provide text transfer 302 to an  
2 operations center 250' and receive payments 306 from a billing and collection system  
3 278'. A separate channel uplink site 254' is shown in this configuration receiving data  
4 310 from the operations center 250'. The operations center 250' has three separate  
5 sections (318, 322, 326) one for text receiving, formatting and re-entry 318, a second for  
6 security encoding 322 and a third section for catalog and messaging center functions 326.

7 The billing and collection system 278' shown has two sections (330, 334) one for  
8 transaction management, authorizations and publisher payments 330, and the other for  
9 customer service 334. The customer service section 334 provides for data entry and  
10 access to customer account information. Transaction accounting information 338 is  
11 supplied to credit card companies 342 by the transaction management section 330 of the  
12 billing and collection system 278'. The credit card companies 342 provide billing 346 to  
13 customers either electronically or by mail.

14 Three methods for communicating between customer base 348 and the billing and  
15 collection system 278' are shown: by telephone switching 350 alone, cellular switching  
16 354 and telephone switching 350 combined, and by use of the cable system 358 and the  
17 telephone switching 350. The system shown supports both one-way 362 and two-way  
18 366 cable communication with customers. Public libraries and schools 370 as well as  
19 bookstores 374 may use the delivery system 301.

20 Public libraries and schools 370 may have a modified system to allow the viewer  
21 266 to be checked-out or borrowed while bookstores 374 may rent or sell the viewer 266  
22 and sell the electronic books. The bookstores 374 as well as the public libraries and  
23 schools 370 may be serviced by cable 378. Optional direct broadcast systems (DBS) 382  
24 can also be used with the delivery system 200. The DBS 382 may provide the electronic  
25 books using digital satellite technology, with the electronic books being received via a  
26 backyard satellite antenna, for example.

27 Figure 3b is an alternate delivery plan 301' that provides for electronic book  
28 selection and delivery using the Internet. In Figure 3b, the publishers 282 provide the

1 electronic books to be posted at the Internet web site 279. The publishers 282 may  
2 convert the text and graphical data to digital format, compress the digital data, and upload  
3 the compressed digital data to the Internet web site 279. Alternately, the publishers 282  
4 may arrange for an outside conversion activity 283 to convert the text and graphical data  
5 to digital format. The conversion activity 283 may then provide the digital data to the  
6 Internet web site 279. For example, a large on-line bookstore could gather publications  
7 in electronic form from a variety of publishers, or could convert hard-copy books to  
8 electronic form, and post the electronic books on the Internet such as at the Internet web  
9 site 279.

10 The electronic books may then be transferred via a public switched telephone  
11 network (PSTN), for example, direct to a subscriber 285, a library 286 and a bookstore  
12 287. The library 286 and the bookstore 287 may also provide electronic books to the  
13 subscriber 285.

14 I. The Operations Center

15 Figure 4 is a schematic of the operations center 250 which includes the uplink  
16 254. The operations center 250 gathers text or books by receiving, formatting, storing,  
17 and encoding. A data stream 302 containing text is received at the operations center 250  
18 by a data receiver 402. The data receiver 402 is under the control of a processor 404.  
19 After reception, the data stream is formatted using digital logic for formatting 406 which  
20 is also under the control of the processor 404. If any additional text is being generated  
21 at the operations center 250 locally for insertion into a distributed signal, the text  
22 generation is handled through text generator hardware 410 which may include a data  
23 receiver and a keyboard (not shown). Following processing by the text generator 410, the  
24 additional text can be added to the text received by the combining hardware 414 that  
25 includes digital logic circuitry (not shown).

26 The processing at the operations center 250 is controlled by a processor 404,  
27 which uses an instruction memory 416. The processor 404 and instruction memory 416  
28 may be supplied by a personal computer or mini-computer. To perform the catalog and

1 messaging functions, the operations center 250 uses a catalog and message memory 420  
2 and the text generator 410 if necessary.

3 The data stream of text, catalog and messages may be encoded by security module  
4 encoding 424 prior to being sent to the uplink module 254. Various encoding techniques  
5 may be used by the security encoding module 424 such as the commercial derivative of  
6 NSA's encryption algorithm (Data Encryption System (DES)) and General Instrument's  
7 DigiCipher II. Following encoding, the encoded text may be stored in text memory 428  
8 prior to being sent to the uplink 254. A first-in-first-out text memory arrangement may  
9 be used under the control of the processor 404. Various types of memory may be used  
10 for the text memory 428 including RAM. The operations center 250 may use file server  
11 technology for the text memory 428 to catalog and spool electronic books for  
12 transmission as is described below.

13 To transmit textual data (i.e., electronic books), the delivery system 208 may use  
14 high bandwidth transmission techniques such as those defined by the North American  
15 Broadcast Teletext Standard (NABTS) and the World System Teletext (WST) standard.  
16 Using the WST format (where each line of the Vertical Blanking Interval contains 266  
17 data bits), a four hundred page book, for example, may be transmitted during  
18 programming using four lines of the Vertical Blanking Interval at a rate of approximately  
19 one book every 1.6 minutes (63,840 bits per second). Alternatively, electronic books may  
20 be transmitted over a dedicated channel, which interrupts programming so that 246 lines  
21 of video can be used to transmit approximately 2,250 books every hour (3.9 Mbits per  
22 second). A teletext type format is the simplest but possibly the slowest text format to use  
23 with the delivery system 200. In either event, an encoder 204 is utilized at an uplink site  
24 254 to insert textual data into the analog video signal. In many other respects, the  
25 delivery of the textual information is completed using existing cable television plant and  
26 equipment.

27 Figure 5a is a flowchart of the steps involved in an embodiment of processing text  
28 from the publisher or content provider 282 that occurs at the operations center 250. As

1 shown in block 500, the publisher 282 processes data files of text for books, compresses,  
2 encrypts and sends the data files to the operations center 250 or uplink 254. Text files  
3 for books may be sent one book at a time. As shown in block 504, the uplink 254 or  
4 operations center 250 receives and processes the data stream from the publisher 282.  
5 Generally, part of this processing includes encryption and error correction.

6 As shown in block 508, files are broken into smaller packets of information.  
7 Header information is added to the packets. The bit stream is converted from a serial  
8 digital bit stream to an analog bit stream that is compatible with an NTSC video signal.  
9 Block 512 shows the switching of analog data into the video lines of a video signal. The  
10 analog data is generally placed either in the VBI or the active video lines. In some  
11 instances, it may be preferable to utilize unused portions of bandwidth (such as 5-40  
12 MHZ, 70-75 MHZ, 100-109 MHZ or other guard bands) instead of the video lines.

13 Figure 5b is an example of a hardware configuration to perform some of the  
14 functions for blocks 508 and 512. A video feed 516 is received and processed through  
15 a sync stripper 520. The stripped sync signal 532 is used by the digital logic control 524.  
16 The digital logic control 524 receives the sync signal 532 and a serial digital bit stream  
17 528 for processing. The digital logic control 524 passes the serial digital bit stream to the  
18 Digital to Analog converter 536 and outputs a control signal 540 for the video switch  
19 544. The video switch 544 integrates the video feed 516 and analog data stream 548 into  
20 a video feed with analog data signal inserted 552.

21 As an alternative to cable, satellite, broadcast, or other television delivery  
22 methods, the public telephone system may be used to transmit books to the subscribers.  
23 An average electronic book would take about 7 minutes to transmit over the public  
24 telephone system. Using the telephone system, it is not necessary to combine video and  
25 text into a composite signal. In most other respects, the operations center 250 would  
26 remain similar whether text delivery was by telephone or cable. File server technology  
27 (such as that described in U.S. Patent No. 5,262,875, entitled AUDIO/VIDEO FILE  
28 SERVER INCLUDING DECOMPRESSION/PLAYBACK MEANS, issued to Mincer,

1 et al., and, U.S. Patent No. 5,218,695, entitled FILE SERVER SYSTEM HAVING  
2 HIGH-SPEED WRITE EXECUTION, issued to Noveck, et al., incorporated herein by  
3 reference) may be used at the operations center 250 with a telephone system text delivery  
4 method.

5 As another alternative to cable, television, and telephone system delivery, the  
6 public telephone system may be used to provide access to the Internet, where the Internet  
7 web site 279 (*see* Figure 2) may be accessed. Electronic books may be ordered, paid for,  
8 and delivered directly from the Internet web site 279 over the telephone system.

9 In any delivery system using the telephone system, individual subscribers may  
10 increase the electronic book delivery rate by incorporating high speed modems or other  
11 communication devices such as an Integrated Services Digital Network (ISDN)  
12 connector, or by use of a Digital Subscriber Line (DSL)

13 II. The Home System

14 The hardware configuration for a multiple component home system 258 is shown  
15 in Figure 6a. Figure 6b shows a hardware configuration for a two component home  
16 system. The hardware components may also be incorporated into a single unit that  
17 communicates with a terminal in a television delivery system or with a telephone system  
18 by use of a modem, for example. The home system 258 performs several functions, such  
19 as receiving data and video transmissions, stripping (or extracting) the data from the  
20 video signal, screening and storing the data, providing subscriber-friendly interface  
21 controls and software, displaying menus and text, processing transactions, initiating  
22 telephone calls and transmitting billing data. Various hardware configurations may be  
23 utilized to achieve the desired functions of the home system 258. For example, as shown  
24 in Figure 6b, the home system 258 can be configured to use the reception and channel  
25 tuning capability of the current installed subscriber base of cable converter boxes and  
26 televisions 601. The home system 258 can be designed as an advanced set top terminal  
27 converter box with menu generation capability, electronic memory and a telephone

1 modem as described in section V below. The home system 258 may also use other  
2 telecommunications systems such as the PSTN to receive electronic books.

3 The electronic components that make up the home system 258 may be arranged  
4 in a variety of ways. In the four unit system of Figure 6a the viewer 266 and library unit  
5 262 are wired together via a signal path 615 while the remaining components  
6 communicate through RF transceivers 604. Alternatively, the viewer 266 and the library  
7 unit 262 may communicate using RF signaling over wireless path 615'.

8 Also shown in Figure 6a is an auxiliary data device 269, connected to the viewer  
9 266, which may be a hand-held calculator or a separate disk drive or other data storage  
10 device, for example. A printer 265 may be connected to the viewer 266 and/or the library  
11 262.

12 In an embodiment of the home system 258 there are only two units, the library  
13 262 and the viewer 266. Figure 6b shows a two unit home system 258 with certain  
14 optional features. Finally, all the functionality and components of the home system 258  
15 may be incorporated into one electronic book unit, or viewer 266.

16 Referring to Figure 6b, the viewer 266 may be equipped with a high resolution  
17 viewing area 602, digital logic (including a key 605, security 606, and a microprocessor  
18 621), video graphics control and memory 607, power supply circuitry 602 (not shown),  
19 an optional battery 603 and an optional RF transceiver 604. In a two unit arrangement,  
20 the library 262 contains the connector function to the distribution system 208, connector  
21 function to the telecommunications system 274, and memory 600 (which may be  
22 removable and portable 600'). More specifically, the library 262 may include data  
23 stripping functions 617, digital logic 609, the memory 600, power circuitry 610, optional  
24 telephone connections 611 (including cellular or PCN 611'), an optional battery (not  
25 shown), optional tuner module 613 and an optional RF transceiver 604. The video  
26 connector 212 and the telecommunications system connection 270, as well as the  
27 removable portable memory 600' of the library 262 may be broken out into separate  
28 components. (Figure 6b shows a removable portable hard disk memory 600' with

1 removable cartridges 614.) The home system 258 may include an attached keyboard 267  
2 or a wireless keyboard 268 (shown in Figure 6a). Both the attached keyboard 267 and  
3 the wireless keyboard 268 may be used to communicate with the viewer 266 or the library  
4 262. The viewer 266 may also receive data from auxiliary data source 269 including a  
5 programmable, hand-held calculator and a separate disk drive or other data storage  
6 device, for example. The viewer 266 may output data and text, such as a portion of the  
7 electronic book, to the printer 265 or other display device.

8 The wireless keyboard 268 may communicate via radio frequency (RF) signaling,  
9 for example. Therefore, the home system 258 may have as many as six separate  
10 components that communicate with each other. The two, three, four, five or six separate  
11 components that make up the home system 258 can communicate with each other in a  
12 variety of ways, including hardwired connection 615, RF transceiver 604, and other  
13 wireless methods.

14 RF communications are preferred in the home because they allow separate  
15 components to be located throughout the home without restriction. The data  
16 communicated between the units is preferably secure data. In addition, the library 262  
17 may provide power to the viewer 266 through the hardwired connection 615.

18 Alternatively, a single unit may perform all of the home system 258 functions.  
19 The single unit may use light-weight materials, including a light-weight battery. A single  
20 unit eliminates the need to communicate (externally) between units. The single unit is  
21 less expensive and eliminates duplicative processing, memory storage and power  
22 circuitry.

23 To receive and strip the data from the video signal at the subscriber's home, the  
24 connector 212, which may be either a cable interface device or cable connector, for  
25 example, is used. The cable connector device includes a tuner 613, while the cable  
26 interface device makes use of existing tuning equipment in the home. In either  
27 configuration, data is stripped from the video signal and stored at the subscriber's location  
28 in the library 262. The connector 270, and modem 611 initiate telephone calls and

1 transmit ordering and billing information to the operations center 250 or billing and  
2 collection system 278. Alternatively, the connector 270 and the modem 611 may be used  
3 to provide access to the Internet to order and receive electronic books from an Internet  
4 web site. A digital connector 619 is provided to communicate digital information with  
5 the set top 601. The library 262 incorporates the hardware and software necessary to  
6 store the text data, generate menus and effect the purchase transactions. In addition to  
7 an RF transceiver 604, the library 262 also includes the necessary jacks and connections  
8 to allow the delivery system 200 to be connected to the viewer 266. As shown in Figure  
9 6b, the library 262 communicates the text data (electronic book) to the viewer 266 in a  
10 secure format that requires a key 605 for decryption. The text may be decrypted page by  
11 page just before viewing.

12 a. The Connector

13 Figure 7 shows the flow of the processes performed by the connector 212. In step  
14 S608, the connector 212 receives the video signal. In step S612, the connector 212 tunes  
15 to the channel containing the text data. Next, in step S616, the connector 212 strips the  
16 text data from the video signal. Finally, in step S620, the connector 212 communicates  
17 the text data stream to logic components in the library 262.

18 The connection to the distribution system 200 may be a cable connector 212' to  
19 a cable television delivery system, as shown in Figure 6b. The cable connector 212' includes  
20 a data stripper circuit 617, which accepts video input from either a set top  
21 converter, TV or VCR 601, or an optional tuner block 613 that receives the CATV signal  
22 through the cable connector 212'. The data stripper circuit 617 strips data out of the  
23 video, and outputs a digital bit stream to the digital logic portion 609 of the library 262.  
24 The data is embedded in the video signal either in the vertical blanking interval or the  
25 active video portion in an encrypted and compressed format. The data stripper circuit  
26 617 can be placed inside the set top 601, the TV, or in the library 262. The data stripper  
27 circuit 617 outputs the digital bit stream to be used by the library digital logic 609.

1           The connector 212 may also contain a channel tuner module 613 that can tune to  
2 the video channel and provide access to the video that contains the data to be stripped.  
3 Using the optional tuner module 613, a set top, VCR, or TV tuner is not needed in the  
4 home system 258. The optional tuner module 613 would instead receive the video signal  
5 directly through the cable connector 212'.

6           b.     Library

7           An embodiment of the library 262 for a two unit home system 258 is shown in  
8 both Figure 6b and Figure 8. The embodiment shown includes the following optional  
9 parts: the connectors 212 and 270, RF transceiver 604, and battery pack 624 in addition  
10 to a removal portable memory 600', microprocessor 628, instruction memory unit 632,  
11 digital logic 636, and power unit 640.

12          The library 262 contains a digital logic section 609 (not shown in Figure 8) that  
13 includes the microprocessor 628, the digital logic 636 and the instruction memory unit  
14 632. The microprocessor 628 is preferably a secure microprocessor such as the Mot  
15 SC21 device sold by Motorola. The digital logic section 609 will receive the serial digital  
16 bit stream from the data stripper circuit 617 and process the data. Error correction will  
17 also be performed by the digital logic section 609 and the data will be checked for proper  
18 address. If the address of the data is correct and the library 262 is authorized to receive  
19 the data, the data will be transferred to the memory storage unit 600, 600'. Authorization  
20 to receive the data is provided by the cable headend, operations center, or another  
21 distribution. An authorization code may be sent in the serial digital bit stream. The  
22 digital logic section 609 will send appropriate text and graphical data to the memory  
23 storage unit 600, 600'. The digital logic 609 transfers this data in a compressed and  
24 encrypted format and the data remains stored in a compressed and encrypted format.

25           i.     Memory Storage Unit

26          The memory storage unit of the library 262 may be a removable portable memory  
27 unit 600' (as shown in Figures 6a, 6b and 8). A variety of options are available for  
28 memory storage: a hard disk drive, a hard disk with removable platters, and a CD ROM.

1 Referring to Figure 6b, a hard disk drive unit 600' that contains removable platters 614  
2 may also be used. This would provide virtually unlimited library storage capacity. Data  
3 (i.e., electronic books) may be stored in the memory storage unit 600' in a compressed  
4 and encrypted format. As is also shown in Figure 6b, the data may also contain a key or  
5 unique ID number that matches the ID or key of the viewer 266. This matching of a  
6 unique key or ID number prevents unauthorized transfer of text data from the memory  
7 storage unit 600' to an unauthorized viewer. Small memory devices such as smart cards,  
8 electronic memory cards, PCMCIA cards (personal computer memory card industry  
9 association) or memory sticks, may also be used to store the data.

10                   ii.     Power Circuitry

11                   As shown in figures 6b and 8, the library 262 may accept power from either AC  
12 wall power 610, DC power 640, or optional battery power 624. The power circuitry 610,  
13 640 may provide all the voltage necessary from either the battery 624 or AC unit for the  
14 various circuitry in the library 262. The power circuitry 610, 640 may also provide power  
15 to the viewer 266 through a single data cable when connected to the viewer 266. The  
16 power circuitry 610, 640 will recharge the battery using AC power when in operation.  
17 With the optional battery unit 624 installed, the library 262 becomes a portable unit and  
18 can still provide power to the viewer 266. In order to extend battery life, power  
19 conservation measures may be utilized, such as shutting down the memory system when  
20 not in use. When the viewer 266 is being utilized and the library circuitry is not being  
21 utilized, virtually all power may be shut down to the library 262.

22                   iii.    Connection to the Public Telephone System

23                   The connection to the telephone system may be provided by a modem 611.  
24 Various available modems may be used to perform this function. As shown in Figure 6b,  
25 cellular phone or PCN phone connections 611' may also be provided. When the home  
26 system 258 is first initialized, the modem 611 may be used to transfer the name and credit  
27 card information of the subscriber to the billing and collection system 278. The  
28 connection 270 may be utilized each time an electronic book is purchased by a subscriber

1 to complete and record the transaction. The connection 270 may also be used as a means  
2 for receiving the electronic books from the operations center 250 or from an Internet web  
3 site, by-passing the distribution system 208. The phone connection 270 may be a separate  
4 unit as shown in Figure 6b.

5                   iv. Library Processing

6                   Figure 9 shows an example of some basic processing performed by the  
7 microprocessor 628 of the library 262 on the data stream 651 received from the connector  
8 212 or stripper circuit 617. First the data stream 651 is checked for error correction in  
9 error correction step S650. If an error is detected, the microprocessor 628 de-interleaves  
10 the data (step S654) followed by running a FEC (Forward Error Correcting) algorithm in  
11 step S658. The combination of steps S650, S654 and S658 comprise the error correction  
12 process needed on the data stream 651. If no error correction is necessary the processing  
13 moves to step S662 where packets are individually checked for packet address by the  
14 microprocessor 628.

15                   If the address is a unique address, in step S666, the microprocessor 628 checks  
16 whether the address of the packet matches the library 262 ID number. The library 262  
17 ID number is a unique number associated with that library 262 and is used to ensure  
18 security of the data. In file open step S670, the microprocessor 628 determines whether  
19 an electronic file has already been opened into which the data packet can be saved. If no  
20 data file has been opened then in step S674, the microprocessor 628 opens a new data file  
21 for that packet. If an electronic file has been opened, then in step S678 the packet is  
22 saved in that electronic file on disk. Next, in step S682, the microprocessor 628 checks  
23 to see if this is the last packet for a particular book for a particular textual data block  
24 being received. If it is the last packet of information, then the electronic file is closed and  
25 the directory of available electronic files is updated in step S686. Following either step  
26 S682 or S686, the microprocessor 628 returns to receive another data packet from the  
27 data stream 651.

1        If the packet address is checked and the address is determined to be a broadcast  
2        address, in step S690, the microprocessor 628 determines the type of message that is  
3        being sent. The message may be an index of book titles, menu (and menu graphics)  
4        information, announcements, special offerings, discounts, promotions, previews etc. The  
5        message is then stored in appropriate electronic message file in step S694 and the  
6        microprocessor 628 returns to step S650 to receive another data packet and perform  
7        another error check.

8        Using the process of Figure 9, the library 262 is able to receive, store and update  
9        directories related to the textual data and graphical data (that can be used to depict  
10        pictures in a given book or to generate menus). Variations of the processes are possible  
11        depending on the format of the data and operating system of the library 262.

12       Figure 10 shows an example of the processing of information requests from the  
13        viewer 266 at the library unit 262. Information requests from the viewer 266 are received  
14        either through the cable connecting the viewer 266 to the library 262 or through wireless  
15        transmissions, such as RF. In some embodiments, subscriber requests may come from  
16        a set top terminal 601 (see Section V).

17       Information requests received from the viewer 266 may fall into three categories:  
18        (1) directory data of electronic books stored in the library 262, (2) index of all available  
19        electronic books on the system 200, and (3) requests for a specific electronic book, the  
20        microprocessor may receive one of these requests in step S700. In step S704, the  
21        microprocessor 628 answers a request from the viewer 266 for a directory of data  
22        showing the electronic books stored at the viewer 266. The directory of data is sent to  
23        the viewer 266 so that it may be displayed to the subscriber. In step S708, the  
24        microprocessor 628 handles requests from the viewer 266 for an index of all available  
25        electronic books on the home system 258. The microprocessor 628 will obtain an index  
26        of all the available books on the system and transmit that index, with menu information  
27        to the viewer 266 in step S712. In step S716, the microprocessor 628 replies to a request  
28        from the viewer 266 for a specific electronic book. In step S720, the microprocessor 628

1        opens an electronic file for the specific electronic book requested by the viewer 266 and  
2        transmits the record or transmits the information on a packet-by-packet basis to the  
3        viewer 266. This process of transmitting the specific electronic book, record, or packets  
4        to the viewer 266 continues until the last record or packet has been sent.

5        In addition to the processes shown on Figure 10 in handling a request for a  
6        specific electronic book, the library 262 also orders and receives specific electronic books  
7        from the operations center 250 or other distribution site using the process as described  
8        in step S716. Following a request for a specific electronic book that is not stored at the  
9        library 262, the library 262 may determine the next available time the electronic book will  
10      be on the distribution system 208 and ensure reception and storage of that electronic book  
11      (process not shown). In performing this process the library 262 may transmit to the  
12      viewer 266 information on when it will obtain the electronic book so that the subscriber  
13      may view the electronic book. In addition to timing information, price and other ordering  
14      information may also be passed by the library 262 to the viewer 266.

15      c.        The Viewer

16      Figure 11 is a block diagram of the viewer 266 showing its internal components.  
17      The viewer 266 of Figure 11 is similar to the viewer 266 depicted in Figure 6b. The  
18      viewer 266 is designed to physically resemble a bound book. The viewer 266 may  
19      include five primary components and six (or more) optional components: (1) LCD  
20      display 602, (2) digital circuitry (not shown), (3) video graphics controller 607', (4)  
21      controls 740, (5) book memory 728, (6) optional power supply circuitry 736, (7) optional  
22      battery 603', (8) optional RF transceiver 604, (9) optional cellular or mobile  
23      communicator (608), (10) optional keyboards 267 and 268, and (11) a  
24      speaker/microphone 608'.

25      (1)       A high resolution LCD screen 602, preferably of VGA quality, is used by  
26      the viewer 266 to display text and graphic images. The screen is preferably the size of  
27      one page of a book. A two page screen or two screens may also be used with the viewer

1 266. Other flat panel displays, such as a plasma display, may also be used with the  
2 viewer 266.

3 (2) Digital circuitry that includes a secure microprocessor 621, instruction  
4 memory 732, and digital logic. Data is transferred to the viewer 266 in compressed and  
5 encrypted format. The secure microprocessor 621 compares the ID number of the viewer  
6 266 with the incoming data stream and only stores the text data if the ID number of the  
7 viewer 266 matches that within the incoming data stream. The viewer 266 may be  
8 configured to not output text data or other data and that the data is decompressed and  
9 decrypted only at the moment of viewing and only for the current page being viewed.  
10 These measures provide additional security against unauthorized access to data.

11 (3) A video graphics controller 607' that is capable of assisting and displaying  
12 VGA quality text and graphic images is included in the viewer 266. The graphics  
13 controller 607' is controlled by the digital circuitry described above. Text may be  
14 displayed in multiple font sizes.

15 (4) The viewer 266 of Figure 11 has touch panel controls 740. These unique  
16 and novel controls 740 allow the subscribers to select stored electronic books and  
17 electronic books from catalogues, move a cursor, and turn pages in a book. The controls  
18 740 may include forward and reverse page buttons 742, 741, a ball (or trackball) 743 for  
19 cursor movement, one or more selection buttons 745, a current book button 747 and a  
20 bookmark button 749 (see Figure 14a).

21 The controls 740 should be easy to use and conveniently located. Referring to  
22 Figure 14a, the controls for the viewer 266 may be located below the screen 602 at the  
23 bottom portion of the viewer 266. The next page turn button 742 is the most used button  
24 740 and may be located towards the right edge of the page. The subscriber is likely to use  
25 right hand thumb movements to work the controls particularly the page turn buttons 741,  
26 742. Therefore, the buttons may be arranged in such a manner that the buttons are easily  
27 controlled by a subscriber's right thumb. Generally, this can be accommodated either on  
28 the lower portion of the viewer 266 (as shown) or along the right hand margin of the

1 viewer 266 (not shown). The current book button 747 and bookmark button 749 are  
2 usually the least used of the controls 740. Therefore, in the example shown those buttons  
3 747, 749 are located on the inside portion towards the binder of the viewer 266.

4 Locating the ball 743 or other cursor movement device (such as four pointer  
5 arrows -- not shown) in the bottom center of the viewer 266 is both easier for the  
6 subscriber to use and easier in manufacturing the viewer 266. The selection buttons for  
7 the cursor 745 may be located below the middle diameter of the cursor ball 743 on the  
8 right and left sides of the ball as shown. If pointer arrows are used for cursor movement,  
9 a selection button 745 may be located in the center of the four arrow buttons (not shown).  
10 Again, the most used controls should be located where a subscriber's right hand thumb  
11 would normally rest.

12 The controls 740 may also include a touch-sensitive screen and various soft keys  
13 or buttons. In an embodiment, the controls 740 may include a soft keyboard or number  
14 pad.

15 (5) Book memory 728 for at least one electronic book or more of text is  
16 included in the viewer 266. The book memory 728 stores text and any graphics, video,  
17 or audio that represent content in a book. The book memory 728 can also store menu  
18 graphics data. Two different memory devices may be used in the viewer 266, one (732)  
19 for the instructions for the microprocessor 621 in the digital circuitry and a second type  
20 of memory may be used for the book memory 728 (and graphics). Various memory  
21 devices available on the market may be used such as, ROM, RAM or a small hard disk.  
22 Since an electronic book requires approximately 0.6 megabytes of storage, a small hard  
23 disk providing approximately 60 MBytes of storage provides memory to store  
24 approximately 100 electronic books. The large hard disk drives currently available allow  
25 for storage of thousands of electronic books. Other memory devices, including  
26 removable memory devices, may be used in conjunction with the book memory 728. The  
27 book memory 728 may also store portions of electronic books, with remaining portions  
28 delivered to the home unit 258 at a later date.

1           Text for books may be displayed in various font sizes. To accommodate various  
2 fonts for display, a variety of fonts are stored in instruction 732 or book memory 728.  
3 Thus larger or smaller fonts may be recalled from memory 732 or 728 to create displays  
4 desired by the subscriber.

5           (6)    Power supply circuitry 736 in the viewer 266 will accept power from  
6 either an AC power source or from an optional battery 603', or the library 262. The  
7 power supply circuitry 736 provides the necessary voltages to accommodate the various  
8 systems within the viewer 266.

9           (7)    An optional battery 603' is provided in an embodiment. The battery 603'  
10 is automatically recharged when AC power is available.

11          (8)    An optional RF transceiver 604 that provides a two-way data link between  
12 the viewer 266 and other components of the home system 258 can also be included in the  
13 viewer 266.

14          (9)    The viewer 266 may include a cellular modem 608 for mobile  
15 communications.

16          (10)   The optional wired (attached) keyboard 267 and wireless (e.g., RF)  
17 keyboard 268 (see Figure 6a) may be used with the viewer 266 to provide  
18 communications between the subscriber and the viewer 266.

19          (11)   The speaker and microphone 608' allow the viewer 266 to provide audio  
20 signals to the subscriber, and allow the subscriber to provide an audio input. The speaker  
21 and microphone 608' may be used in conjunction with the cellular modem 608 or other  
22 telecommunications equipment to provide for reception and transmission of telephony  
23 and data.

24          The viewer 266 of Figure 11 has parts available for providing connections to: a  
25 library 744, electronic card memory 748, CD ROM units 752, and a portable memory unit  
26 756 (such as that shown in Figure 6b 600'). Various electronic memory cards such as  
27 PCMCIA can be used with this viewer 266.

1           Security, low power consumption and excellent display technology are desired  
2           features of the viewer 266 design. The viewer 266 should be lightweight and portable.  
3           The viewer 266 contains a software operating system that allows electronic books to be  
4           stored, read and erased and includes the capability to order electronic books and retain  
5           them in memory 728 permanently or for a predefined period of time determined by the  
6           system operator. The software can be configured to allow the electronic book to be read  
7           during a period of time (i.e., two weeks) and then automatically erased, read once and  
8           erased, held in memory permanently, or overwritten by another electronic book.  
9           Preferably, each viewer 266 has a unique key 605. All of the data storage is encrypted  
10          with the key 605 for an individual viewer 266 to prevent more than one viewer 266  
11          accessing the text file or electronic book file.

12          Figure 12 is a flow diagram of some of the processes executed by the viewer 266.  
13          Generally, the viewer 266 receives inputs from the subscriber through touch panel  
14          controls 740. Alternately, the viewer 266 receives inputs from the touchscreen display,  
15          the attached keyboard 267, or the remote keyboard 268. In step S800, the subscriber's  
16          information requests are processed 800 by the viewer 266.

17          If the subscriber requests a menu of available electronic books, process block 804  
18          will select a book menu. Process block 808 will open the electronic files which list the  
19          electronic books that are available (related to the category of topic of the menu) and  
20          display the menu with the names of the available electronic books.

21          If the subscriber selects a particular electronic book to read, then process block  
22          812 will process the selection and determine the electronic file that contains the specific  
23          electronic book. Process block 816 will open the file for that specific book and normally  
24          access the first page. (If a pointer has already been set in that electronic book's file, the  
25          process may default to that page.) Process block 820 will then determine which page  
26          needs to be displayed. Process block 820 will determine whether a next page, previous  
27          page or a book marked page needs to be displayed. If the pointer for the electronic file  
28          is not in the correct location then process block 828 will move the pointer and obtain the

1 previous page of data from the stored file. Otherwise, process block 824 will normally  
2 obtain the next page of text from the stored electronic file. Process block 832 will  
3 decrypt and decompress the text data and send the data to the video display. The video  
4 display will generally have a video display memory associated with it and process block  
5 832 will send the data directly to that video display memory. The circuitry for the display  
6 then completes the process of displaying the page of text. If the next page is not in  
7 storage, the viewer 266 will initiate actions to retrieve the remaining portions of the  
8 electronic book from the library system or the operations center 250 as necessary.

9 If the subscriber, through the controls 740, requests (from process block 800) that  
10 the power be turned off, then the process, 836, of turning the power off will be initiated.  
11 Process block 840 saves the pointer in memory to the page number in the book that the  
12 viewer 266 is currently reading. Process block 844 closes all the electronic files and  
13 signals the power circuitry to shut down the power to the various circuits in the viewer  
14 266. The subscriber may also use the controls 740 to access other electronic files using  
15 electronic links embedded in a particular electronic file. An electronic link system will  
16 be described later in detail. The electronic book links system is described in U.S.  
17 Application Serial No. 09/237,828, filed on January 27, 1999, entitled ELECTRONIC  
18 BOOK ELECTRONIC LINKS, which is hereby incorporated by reference.

19 With these examples of basic processes the viewer 266 is able to display book  
20 selections and display text from those books.

21       d.     Menu System

22 Referring generally to Figure 13, the delivery system 200 may have a menu  
23 system 851 for selecting features and electronic books from the delivery system 200. The  
24 operating software and memory required for the menu system 851 may be located at the  
25 viewer 266 (e.g., the instruction memory 732 and/or book memory 728). However, it  
26 may also be located at the library 262 (e.g., the instruction memory 632) or the library  
27 262 and the viewer 266 can share the software and memory needed to operate the menu  
28 system 851. Since the menus are usually displayed on the viewer 266 and it is preferred

1 that the viewer 266 be capable of operating in the absence of the library 262, the basic  
2 software and memory to create the menus is more conveniently located at the viewer 266.

3 The menu system 851 allows sequencing between menus and provides menu  
4 graphics for graphical displays such as on the LCD display 602 of the viewer 266. In a  
5 system which uses a set top converter these menus may also be displayed on a television  
6 screen. In the simplest embodiment, the menus provide basic text information from  
7 which the subscriber makes choices. In more sophisticated embodiments, the menus  
8 provide visual displays with graphics and icons to assist the subscriber.

9 Figure 13 depicts a menu system 851 with sequencing. The primary menus in the  
10 system are an introductory menu 850, a main menu 854 and various submenus 858. In  
11 the embodiment shown, there are three levels of submenus 858. In certain instances one  
12 or two submenus 858 is sufficient to easily direct the subscriber to the selection or  
13 information requested. However, there are features in which three or more submenus 858  
14 make the subscriber interface more friendly for the subscriber. Each level of submenus  
15 858 may consist of multiple possible menus for display. The particular menu displayed  
16 depends on the selection by the subscriber on the previous shown menu. An example of  
17 this tree sequence of one to many menus are the help submenus 887, 888. Depending  
18 upon the specific help requested, a different level two help menu is displayed to the  
19 subscriber.

20 An example of an introductory menu 850 is shown on Figure 14a. Generally the  
21 introductory menu 850 introduces the viewer 266 to the system and provides initial  
22 guidance, announcements and instruction. The introductory menu 850 is followed by a  
23 main menu 854, an example of which is shown in Figure 14b. The main menu provides  
24 the viewer 266 with the basic selection or features available in the system. Figure 14b  
25 is an example of a main menu 854 offering many additional features, including  
26 interactive features, and submenus 858 to the subscriber. For example, Figure 14b shows  
27 that the viewer 266 is able to choose by a point and click method, many options  
28 including: (1) free previews, (2) books you can order, (3) books in your library, (4) your

1 current book, (5) help, (6) on-line services and (6) other system features. Following a  
2 selection on the main menu 854, a corresponding submenu 858 is shown.

3 Figure 13 shows thirteen available primary or first level submenus. They are (1)  
4 account set up 862, (2) free previews 866, (3) book suggestion entries 855, (4) books in  
5 your library 872, (5) books you can order 878, (6) your current book 884, (7) help 887,  
6 (8) available features 890, (9) messages 893, (10) account information 896, (11) outgoing  
7 message submenu 898, (12) show links 970, and (13) create links 980. Figure 14c is an  
8 example of a first level submenu for electronic books in your library 872. This "Book In  
9 Your Library" example submenu 872 shows six available electronic books by title and  
10 author and provides the subscriber with the ability to check a different shelf of books 874  
11 or return to the main menu 854. Figures 14d and 14e show example submenus 858 for  
12 electronic books that may be ordered using the "Books You Can Order" submenu 878.

13 Figure 14f is an example of an order selection and confirmation menu 880', which  
14 provides a "soft keyboard" 975 for the subscriber to use in placing an electronic book  
15 order and which confirms the subscriber's order. In this particular example, the  
16 subscriber is required to enter a PIN number to complete the subscriber's order. The  
17 "soft keyboard" 975 could be configured as a full alpha-numeric keyboard, and may be  
18 used by the subscriber to add additional information related to a book order. An alpha-  
19 numeric or similar password may be used to ensure the subscriber is an authorized  
20 subscriber. In an embodiment, the subscriber confirms an order with a PIN or password  
21 and then receives a final confirmation screen. The final confirmation screen is primarily  
22 text and may state: Your book order is now being processed via CABLE.

23 Your book will be delivered overnight and your VISA account will be charged  
24 \$2.95.

25 Your book will be available for reading at 6:00AM EST tomorrow. Make sure  
26 that:

27 1. your Library Unit and Cable Connection Unit are plugged in with  
28 aerials up tonight; and

1                   2. you tune your cable converter to THE BOOK Channel. The TV set  
2                   does not have to remain on.

3 or similar language.

4                   Examples of the "Account Set Up Menu" 862 and further submenus 858 related  
5 to account set up (which provide instructions and account input 864) are shown in  
6 Figures 14g and Figure 14h. These submenus 858 allow initialization of an account at  
7 the operations center 250 and/or the billing and collection system 278 and orders to be  
8 charged to credit cards. The submenus 858 include the ability to enter data related to a  
9 desired PIN number or password, credit cards, phone numbers, etc. The account set up  
10 may be performed using the telephone system. A confirmation menu verifies that the  
11 account has been properly set up with the desired PIN or password and credit card.

12                  Free previews for books 866 are also provided by submenus (868, 870).  
13 Examples of the free preview menus are shown in Figure 14i and Figure 14j. Figure 14i  
14 shows a menu depicting various electronic books for which previews are available for  
15 viewing. Following an electronic book selection, a screen submenu showing an excerpt  
16 of the selected electronic book cover's description is provided along with an excerpt from  
17 a critic's review of the selected electronic book. In an embodiment, this preview screen  
18 for a particular electronic book also allows the subscriber to select a submenu which  
19 provides information about the author. The book preview submenu may also include a  
20 still video picture or graphics portraying a book cover or a scene from the electronic  
21 book. An example of such a still video picture or graphics is shown in Figure 14j which  
22 depicts a preview screen 870 about the author. The video may also be provided  
23 according to MPEG standards as a short moving video clip. Such a clip could be an  
24 interview with the author, for example. The author's preview screen 870 shows a picture  
25 of the author, provides a short biography, and may allow the subscriber to order the  
26 author's books. The price for ordering the author's various electronic books may also be  
27 shown on the menu. Alternatively, the previews may be provided through an electronic  
28 link system, which will be described in detail later.

1 Referring to Figure 13, submenus 858 are shown on the "Books In Your Library"  
2 submenu 872 and are preferably broken into shelf numbers with submenus for each shelf  
3 874, 876. The submenus 858 for the "Books You Can Order" submenu 878 is similarly  
4 broken out into submenus by shelves 880, 882. These shelves may each be a category or  
5 genre of books. Electronic books may be grouped into categories such as best sellers,  
6 novels, fiction, romance, etc. See Figure 14d. An initial portion of some "Books You  
7 Can Order" may already be resident on the home system 258 for immediate viewing.

8 Referring to Figure 13, the submenu 858 for "Your Current Book" 884 allows a  
9 subscriber to select a current book 884 and then determine what page to view. This  
10 selection is confirmed with a level two submenu 885. The help submenu 887 provides  
11 the subscriber with additional help screens 888. The submenus 858 for available features  
12 890 are preferably broken out into a sequence of separate submenus for each feature 891,  
13 892.

14 Referring to Figure 13, messages can also be sent with the delivery system 200.  
15 A level one message screen provides the subscriber with the ability to select from various  
16 messages the subscriber has pending 893. Each message is then shown on a separate  
17 submenu screen 894, 895. The message may contain text and graphics.

18 Referring to Figure 13, account information is shown on a level one submenu 896  
19 and then follow-on submenus 858 show the recent orders and your account balance 897.  
20 There is also a level one submenu for outgoing messages 898 which has a follow-on  
21 submenu used as an input screen 899.

22 In addition to the specific features and submenus described in Figure 13 and  
23 Figure 14a through Figure 14j, many other variations and features are possible. When  
24 a book is finally selected for viewing the title page 886 will appear on the screen followed  
25 by a page of text.

26 e. Book Suggestion System

27 In addition to free previews, in more sophisticated embodiments, the delivery  
28 system 200 provides the subscriber with an electronic book suggestion feature (see 855).

1 This is accomplished using the menu system 851 and the processor with associated  
2 memory located at the viewer 266, library 262 or at the distribution point (1020 or 250).  
3 When necessary, information for the program suggestion feature is sent in the text data  
4 of the composite video signal or other transmission medium, including the PSTN, to the  
5 home system 258. With this feature, books or authors are suggested to a subscriber based  
6 upon historical data of the subscriber's previous orders, demographics or mood of the  
7 subscriber, other indicators, and/or by text word searches.

8 In a book suggestion embodiment, text word searches of preview information  
9 (such as book cover descriptions, critics' reviews and biographies about the author) and/or  
10 text of books or other titles are performed by the library 262 using databases stored in the  
11 library memory 600. Personalized book or author suggestions are made to the subscriber  
12 by obtaining information from the subscriber indicative of general subscriber interests.  
13 Subscriber entries are solicited from the subscriber preferably using the electronic book  
14 suggestion entries submenu 855. The system uses these subscriber entries either directly  
15 or indirectly to search for books or authors to suggest to the subscriber. The book  
16 suggestion feature may also be supported by databases and processors located at the  
17 distribution point (1020 or 250).

18 Generally, the book suggestion methods may be categorized into two categories,  
19 either responsive methods (which respond to a series of subscriber menu entries), or  
20 intelligent methods (which analyze data to suggest an electronic book). Using a  
21 responsive or intelligent method, the delivery system 200 determines a list of suggested  
22 titles or authors and creates a second or third level submenu 856, 857 to suggest the titles  
23 for subscriber selection.

24 Responsive methods of suggesting titles include, for example, the use of mood  
25 questions, searching for authors, and keyword searching. Using the instruction memory  
26 732 and menu generation hardware (e.g., 607) of the viewer 266, a series of mood  
27 questions can be presented on menus to determine a subscribers interest at a particular  
28 time. For this methodology, the operations center's 250 processor 404 and instruction

1 memory 416 assign each title mood indicators (and subindicators) from a group such as  
2 light, serious, violent, short, long, dull, exciting, complex, easy-read, young theme, old  
3 theme, adventure, romance, drama, fiction, science-fiction, etc. These indicators are sent  
4 to the home system 258 with the text data and are stored in the library memory 600.  
5 Based upon the subscriber entries, the processor 404 associates a set of indicators with  
6 the subscriber's request and a set of electronic books with matching indicators are located  
7 for suggesting to the subscriber.

8 Responsive searches for authors or keywords (a search word provided by the  
9 subscriber) are generally performed by the library processor 628 and instruction memory  
10 632 on data stored in the library memory 600. For example, a keyword given by the  
11 subscriber may be searched for a match in library memory 600 storing the book reviews,  
12 critics and previews databases. Thus, if a subscriber provided an entry of the word  
13 "submarine" on an appropriate submenu, the title "Hunt For Red October" may be located  
14 by the library processor 628 using instruction from a routine in the instruction memory  
15 632.

16 Intelligent methods of suggesting programs include analyzing personal profile  
17 data on the subscriber and/or historical data about the subscriber such as past books  
18 ordered by the subscriber (or buy data). This method is preferred in a book on demand  
19 system and can be performed at the distribution point or operations center 250 by the on-  
20 site processor 404 using subscriber databases stored in memory 428. The home system  
21 258 receives the text data including program suggestion information from the distribution  
22 point, e.g., the operations center 250 and generates the program suggestion submenus  
23 855, 856, 857 using the same text data receiving 212 and viewer menu generation  
24 hardware (e.g., 607, 621) described above. Software routines and algorithms stored in  
25 instruction memories (e.g. 632, 732) are used to analyze historical data and book ordered  
26 data to determine a line of books to suggest to the subscriber.

27 The algorithms for this powerful feature of suggesting books or authors to  
28 subscribers are disclosed in great detail in U.S. Patent No. 5,559,549, entitled

1 REPROGRAMMABLE TERMINAL FOR SUGGESTING PROGRAMS OFFERED ON  
2 A TELEVISION PROGRAM DELIVERY SYSTEM, issued September 24, 1996, and  
3 are incorporated herein by reference.

4 **III. The Billing And Collection System**

5 The billing and collection system 278 (shown in Figures 2 and 3) uses the latest  
6 technology in electronic transaction and telephone switching to track orders, authorize  
7 deliveries, bill subscribers, and credit publishers automatically. The telephone calls  
8 initiated by the connector 270 are received by the billing and collection system 278,  
9 which responds immediately without human intervention by placing the order and  
10 charging the subscribers credit card account. Data is compiled periodically and  
11 publishers 282 are credited for sales of their books or other text. The billing and  
12 collection system 278 may also connect with subscribers through two-way cable  
13 connections, cellular, or other communication means.

14 The billing and collection system 278 may communicate with the operations  
15 center 250 to track changes in available books and to provide statistical data to the  
16 operations center 250.

17 **IV. Public Library, School, and Bookstore System**

18 The electronic book system can be modified to be used at public libraries, schools  
19 and bookstores. Figures 15a and 15b show arrangements of components that may be  
20 used at public libraries, schools and bookstores. Figure 15a shows one possible  
21 arrangement of components for a public library location. The main unit at the public  
22 library is the file server 900. The file server 900 is a large electronic memory unit that  
23 can store thousands of electronic books. Various electronic storage means may be used  
24 in the file servers, such as hard disks, read-write CD ROMs and read-only CD ROMs.

25 The system comprises five components; the file server 900, a converter or video  
26 connector 904, a controller 908, a viewer 912, and a catalog printer 916. Also shown in  
27 Figure 15a is a connection to the Internet web site 279 and the intranet 281. The software  
28 for controlling the system is primarily located in the controller 908. The converter or

1 video connector 904 is similar to those described above. In this configuration the  
2 controller unit 908 monitors the data being transferred to the file server 900 by the  
3 converter 904. The controller 908 is preferably provided with a viewing screen and  
4 several control buttons. When it is necessary to have a larger screen to perform more  
5 sophisticated controlling of the system a viewer 266 may be connected to the controller  
6 908 and the viewer screen and controls 740 may be used.

7 The controller 908 is only able to download books to public viewers 912 that are  
8 authorized to receive books from the particular file server 900. For security reasons the  
9 public viewer 912 may not have access to more than one file server 900. In this way,  
10 security can be maintained over the text data for books. The public viewer 912 may be  
11 limited to receiving one or two electronic books at a time from the controller 908. When  
12 the subscriber of the public viewer 912 needs a new or additional electronic book, the  
13 subscriber returns the viewer 912 to the school or public library where the subscriber  
14 receives a new electronic book from the controller 908.

15 In order to track the electronic books that are available on the file server 900, the  
16 titles of the available books may be printed on a catalog printer 916. The catalog printer  
17 916 is connected to the library controller 908 and the titles of the electronic books are  
18 downloaded to the catalog printer 916. None of the coded text for any of the electronic  
19 books can be printed using the controller 908 and catalog printer 916 of this system. In  
20 order to maintain security over the data, none of the electronic book data is allowed to be  
21 downloaded to the printer 916. Once a complete printout of available electronic book  
22 titles, magazines, or other textual material is complete, a hard copy of the catalog 920 can  
23 be maintained at the file server 900.

24 The Internet web site 279 may also be used to download content to the server 900.  
25 The intranet 281 may be established between local libraries in a jurisdiction. For  
26 example, all public libraries in a country may be joined by the intranet 281. Using the  
27 intranet 281, the local public libraries may share electronic books and other data.

1        The system shown in Figure 15a may also be used at bookstores. The bookstores  
2 can rent the public viewer 912 to subscribers with the text for one or two electronic books  
3 loaded onto the public viewer 912. The public viewer 912 may be provided with an  
4 automatic timeout sequence. The timeout sequence would erase the textual data for the  
5 books after a certain period of time, for example, two weeks. It is expected that after a  
6 period of time (perhaps within two weeks) the subscriber would return the public viewer  
7 912 to the bookstore and receive additional electronic books for viewing. Using this  
8 arrangement, it is also possible for the bookstore to (permanently) sell a viewer 912 to  
9 a regular subscriber. The subscriber then returns to the bookstore from time to time to  
10 receive textual data for an electronic book which the customer can then store permanently  
11 on the subscriber's own viewer 912. Various other configurations are possible for  
12 bookstores, schools and public libraries using the file server 900 and public viewer 912  
13 described.

14        A school library, such as a university library, may use an arrangement of  
15 components such as shown in Figure 15b. Many of the components are the same between  
16 Figures 15a and 15b. In Figure 15b, software for controlling the system is primarily  
17 located in the controller 908'. The converter or video connector 904' is similar to those  
18 described above. In this configuration the controller unit 908' monitors the data being  
19 transferred to the file server 900 by the converter 904 and the Internet 279. The controller  
20 908' is preferably provided with a viewing screen and several control buttons.

21        The controller 908' downloads "copies" of electronic books to the viewers 266  
22 that are authorized to receive books from the file server 900. The viewers 266 may be  
23 provided to all students at the university as part of their required equipment. In the  
24 context of the university library, the viewers may be brought to the library to receive  
25 electronic books from the server 900'. Alternately, the university may distribute  
26 electronic books through a university intranet such as the intranet 281. Software  
27 operating on the server 900 may keep track of electronic books loaned to individual

1 students. The students may be required to "return" the electronic books after a set time,  
2 or at the end of a semester, for example.

3 In order to track the electronic books that are available on the file server 900', the  
4 titles of the available books may be printed on a catalog printer 916'. The catalog printer  
5 916' is connected to the library controller 908' and the titles of the electronic books are  
6 downloaded to the catalog printer 916'.

7 The intranet 281 may also be establish connection between university libraries  
8 that are members of an inter-library loan program. In this way, electronic books that are  
9 resident at one university library may be sent to another university library for eventual  
10 loan to a student. In an alternative arrangement, the Internet may be used for inter-library  
11 loan programs.

12 **V. Use Of A Set Top Terminal**

13 Existing set top terminals such as those made by Scientific Atlanta or General  
14 Instruments are presently unequipped to handle the delivery system 200 of the present  
15 invention. Although set top terminals may be built which include the library functions,  
16 hardware modifications are necessary in order to use the delivery system 200 with  
17 existing set top terminal technology.

18 Figures 16a and 16b are examples of hardware modifications or upgrades. A port  
19 is used to attach hardware upgrades described below to a set top terminal. Two upgrades  
20 are possible to set top terminals 601 to assist in receiving and selecting electronic books.  
21 A menu generation card upgrade (Figure 16a) and an information download unit (Figure  
22 16b). Each of these upgrades may be connected to the set top terminal unit through an  
23 upgrade port. A four wire cable, ribbon cable, IEEE 1394 firewire, USB interface, or the  
24 like may be used to connect the upgrade to the set top terminal 601.

25 A card addition 950 to a set top terminal 601 is depicted in Figure 16a. The card  
26 950 shown provides the additional functionality needed to utilize the book selection  
27 system with existing set top terminal 601 technology. The card 950 may be configured  
28 to slip inside the frame of a set top terminal and become part of the set top terminal, an

1 advanced set top terminal. The primary functions the card 950 adds to the set top  
2 terminal 601 are the interpreting of data signals, generating of menus, sequencing of  
3 menus, and, ultimately, the ability of the subscriber to select an electronic book using  
4 either the television or a viewer 266. The card 950 also provides a method for a remote  
5 location, such as the cable headend, to receive information on electronic books ordered.  
6 The electronic books ordered information and control commands may be passed from the  
7 cable headend to the card 950 using telephone lines.

8 The primary components of the card 950 are a PC chip CPU 952, a VGA graphic  
9 controller 954, a video combiner 956, logic circuitry 958, NTSC encoder 960, a receiver  
10 962, demodulator (not shown), and a dialer 611'. The card 950 operates by receiving the  
11 data text signal from the cable headend through the coaxial cable. The logic circuitry 958  
12 of the card 950 receives data 964, infrared commands 966, and synchronization signals  
13 (not shown) from the set top terminal 601. Menu selections made by the viewer 266 on  
14 the remote control are received by the set top terminal's 601 IR equipment and passed  
15 through to the card 950. The card 950 interprets the IR signal and determines the  
16 electronic book (or menu) the subscriber has selected. The card 950 modifies the IR command  
17 to send the information to the set top terminal 601. The modified IR command  
18 contains the channel information needed by the set top terminal 601. Using the phone  
19 line 968 and dialer 611', the card 950 is able to transmit electronic books ordered  
20 information to the cable headend. It is also possible to receive the electronic books over  
21 the telephone lines and by-pass the video distribution system. In this embodiment, the  
22 telephone system may be used to provide access to an Internet web site to order and  
23 receive electronic books.

24 These commands are passed through the interface linking the set top terminal's  
25 microprocessor with the microprocessor of the hardware upgrades. In this way,  
26 subscriber inputs, entered through the set top terminal keypad or remote control, can be  
27 transferred to any of the hardware upgrades for processing and responses generated  
28 therein can then be sent back to the set top terminal for display. In the preferred

1 embodiment the IR commands 966 are transferred from set top terminal 601 to hardware  
2 upgrade.

3 Hardware upgrades may include a microprocessor, interactive software,  
4 processing circuitry, bubble memory, and a long-term memory device. In addition to  
5 these basic components, the hardware upgrade may make use of an additional telephone  
6 modem or CD-ROM device.

7 An information download hardware upgrade 970 (shown in Figure 16b) allows  
8 the subscriber to download large volumes of information from the operations center 250  
9 or cable headend using the set top terminal 601. The hardware upgrade 970 will enable  
10 subscribers to download data, such as electronic books and magazines, to local storage.  
11 Primarily, the hardware upgrade 970 is an additional local storage unit 973 (e.g., hard  
12 disk, floppy, optical disk or magnetic cartridge and may include a microprocessor 975,  
13 instruction memory 977, and a random access memory 979, as shown in Figure 16b).  
14 The viewer 266 also may be provided with the upgrade 970 to enable downloaded text  
15 to be read without the use of a TV.

16 The downloadable information may be text or graphics supplied by the operations  
17 center 250 or cable headend. With this upgrade, electronic books may be downloaded  
18 and read anywhere with the viewer 266. Using this upgrade, electronic books may be  
19 downloaded and stored in compressed form for later decompression. The electronic  
20 books would be decompressed only at the time of viewing. Important text that the public  
21 desires immediate access may made available through this system. Text such as the  
22 President's speech, a new law, or a recent abortion decision rendered by the Supreme  
23 Court may be made immediately available.

24 In an embodiment, electronic book ordering information is stored at each set top  
25 terminal until it is polled by the cable headend using a polling request message format.  
26 An example of a polling request message format consists of six fields, namely: (1) a  
27 leading flag at the beginning of the message, (2) an address field, (3) a subscriber region  
28 designation, (4) a set top terminal identifier that includes a polling command/response

1 (or P/F) bit, (5) an information field, and (6) a trailing flag at the end of the message. A  
2 similar response frame format for information communicated by the set top terminal to  
3 the cable headend in response to the polling request may be used.

4 Figure 17 shows a preferred set top terminal that includes a data receiver 617' and  
5 a data transmitter 981. The data transmitter provides upstream data communications  
6 capability between the set top terminal 601 and the cable headend. Upstream data  
7 transmissions are accomplished using the polling system described and, using a data  
8 transmitter 981. Both receiver 617' and transmitter 981 may be built into the set top  
9 terminal 601 itself or added through an upgrade module. Regardless of the specific  
10 hardware configuration, the set top terminal's data transmission capabilities may be  
11 accomplished using the hardware shown in Figure 17.

12 Figure 17 shows RF signals, depicted as being received by a data receiver 617'  
13 and tuner 613 working in unison. Both of these devices are interfaced with the  
14 microprocessor 983, which receives inputs 990, from the subscriber, either through a set  
15 top terminal's keypad, a remote control unit or the viewer 266. All cable signals intended  
16 for reception on the subscriber's TV are accessed by the tuner 613 and subsequently  
17 processed by the processing circuitry 987. This processing circuitry 987 typically  
18 includes additional components (not shown) for descrambling, demodulation, volume  
19 control and remodulation on a Channel 3 or 4 TV carrier.

20 Data targeted to individual set top terminals is received by the data receiver 617'  
21 according to each set top terminal's specific address or ID. In this way, each addressable  
22 set top terminal only receives its own data. The data receiver 617' may receive set top  
23 terminal 601 specific data in the information field of the signal frame described or on a  
24 separate data carrier located at a convenient frequency in the incoming spectrum.

25 The received data includes information regarding electronic books and menus  
26 available for selection. The subscriber may enter a series of commands 990 using a  
27 keypad or remote control in order to choose an electronic book or menu. Upon receipt  
28 of such commands, the microprocessor 983 instructs the tuner to tune to the proper

1 frequency of the channel carrying data and subsequently instructs the processing circuitry  
2 987 to begin descrambling of this data.

3       Upon selection of the electronic book, the microprocessor 983 stores any selection  
4 information in local memory (not shown) for later data transmission back to the cable  
5 headend. The microprocessor 983 coordinates all CATV signal reception and also  
6 interacts with various upstream data transmission components. Typically, the data  
7 transmitter 981 operates in the return frequency band between 5 and 30 MHZ. In an  
8 alternative embodiment, the frequency band of 10 to 15 MHZ may be used. Regardless,  
9 however, of the frequency band used, the data transmitter 981 sends information to the  
10 cable headend in the information field of the response frame described. Those skilled in  
11 the art will recognize that a number of variations and combinations of the above-  
12 described set top terminal hardware components may be used to accomplish upstream  
13 data transmissions.

14       In the preceding described the use of a set top terminal with the electronic book  
15 system. All the functionality of the set top terminal may also be incorporated into a card  
16 that is a component of a television.

17       **VI. Books-On-Demand System**

18       Electronic books may be distributed using an electronic book-on-demand system.  
19 Figure 18a shows an embodiment of an electronic book-on-demand system 1000. The  
20 electronic book-on-demand system 1000 may use powerful two-way communications  
21 between a subscriber's home, a bookstore, a school or a public library, for example, and  
22 a distribution site 1020. The distribution site 1020 may include an operations center or  
23 a cable headend of a television delivery system, or any other remote location capable of  
24 storing and transmitting digital data. The distribution site 1020 may also include or use  
25 an Internet web site, such as the Internet web site 279 shown in Figure 2. In an  
26 embodiment, the two-way communication may be provided by the hardware shown in  
27 Figure 17 and described above. The book-on-demand system 1000 may be used in  
28 conjunction with the broadcast delivery system 200 described above to create a virtual

1 book-on-demand system. In this embodiment, the broadcast delivery system 200 may be  
2 used to send initial portions of some electronic book and the book-on-demand system  
3 1000 may be used to delivery the remaining portions on demand. Additional electronic  
4 book ordering and delivery systems and methods related to alternative communication  
5 paths are described in co-pending U.S. patent application, Serial No. 09/289,957, entitled  
6 Electronic Book Alternative Delivery Systems, filed on April 13, 1999, the disclosure of  
7 which is hereby incorporated by reference.

8 The electronic book-on-demand system 1000 shown in Figure 18a may use offsite  
9 storage to include a current library of electronic books that a subscriber may order. As  
10 an intermediary between the subscriber's terminal and the content provider 282 (or other  
11 remote site such as a video service provider), the distribution site 1020 performs several  
12 functions. The distribution site 1020 provides the primary means for delivering content  
13 to individual subscribers. In addition, the distribution site 1020 may prepare the  
14 electronic books for delivery. That is, the distribution site 1020 may incorporate the  
15 equipment and routines needed to digitize, encrypt, and compress electronic books for  
16 transmission to the subscriber terminals. The distribution site 1020 may determine the  
17 optimum transmission media, time and date for delivery, and routing plan to send an  
18 electronic book to a particular terminal. For example, if a subscriber's terminal accesses  
19 the distribution site 1020 using a telephone network, the distribution site may determine  
20 the least cost route to transmit the electronic book data. If the subscriber's terminal  
21 accesses the distribution site using a cable television system, the distribution site may  
22 multiplex the electronic book data with signals and digital information received from the  
23 cable television operations center for delivery to the subscriber's terminal. Thus, the  
24 distribution site may offer different subscribers different delivery options and may  
25 allocate the electronic book data in various manners to accommodate different viewers.

26 Referring to Figure 18a, in the electronic book-on-demand system 1000, the  
27 subscriber selects an electronic book to be downloaded from a menu of available  
28 electronic books (see, for example, Figures 14d and 14e). Data for menus of available

1 electronic books may be sent by the distribution site 1020 to a terminal at a subscriber's  
2 location. Terminal 601a may be the home system 258 described above. Alternatively,  
3 terminals 601b, 601c and 601d may be a digital television, a set top terminal and a  
4 personal computer, respectfully, or any component capable of receiving digital data, for  
5 example. The data for menus may be sent by incorporating the data into a composite  
6 video signal, a radio signal, or by using a Public Switched Telephone Network (PSTN),  
7 the Internet, an intranet, a local area network, a wired or wireless data network, a wireless  
8 telephone network, a satellite distribution system, and by hard copy, for example. The  
9 menu data may be used at the home system 258, for example, to generate a menu of  
10 available electronic books. Alternatively, the menu data could be presented in the form  
11 of a pre-formatted menu. The menu data may also be used to generate a menu of  
12 available electronic books that is customized to a particular subscriber. The subscriber  
13 can create one or more custom menus by specifying general areas of interest or other data.  
14 For example, the subscriber could indicate a preference for mystery novels. In this  
15 embodiment, the home system 258 may generate a menu of available electronic books  
16 that are classified as mysteries. The subscriber may also be presented with a customized  
17 menu based on books read data collected by the terminals 601a, 601b, 601c and 601d, the  
18 distribution site 1020, or the billing and collection system 278, for example.

19 The subscriber may select an electronic book to purchase from the menu of  
20 available electronic books such as the books you can order menu 878 shown in Figure 13.  
21 To select the electronic book for purchase, the subscriber may use a remote control device  
22 to highlight a selection from the menu 878 and then operate a send button (not shown in  
23 Figure 13) to send an order to the distribution site 1020.

24 After the subscriber's menu selection, information about the subscriber's selection  
25 (or order) is communicated to the distribution point 1020 using the two-way cable 1044,  
26 the one-way cable 1052, or the telephone system 1048, for example. The electronic book  
27 order may also be transmitted by any other suitable means including a LAN, the Internet,  
28 and an intranet, for example.

1       Upon receipt of the electronic book order, the needed textual and graphical  
2 information for the electronic book may be spooled and sent to the subscriber. In this  
3 manner, electronic books may be sent only when requested by the subscriber. The  
4 electronic books may be sent immediately upon demand for the electronic books.  
5 Alternatively, the electronic books may be sent after a delay. The length of delay may  
6 vary, and may be based on the number of electronic book orders being processed at the  
7 distribution site 1020. The delay may also be based on different classes of service. For  
8 example, a subscriber may be willing to pay extra for immediate delivery of electronic  
9 books.

10      To support the electronic book-on-demand system 1000, electronic book delivery  
11 and distribution may be conducted using a strong nodal architecture distribution system,  
12 such as a video-on-demand cable system, a telephone system, individual telephone calls  
13 on the PSTN or a wireless telephone system, through the Internet, a local area network,  
14 a wired or wireless data network, a wireless telephone network, and a satellite distribution  
15 system, for example. The electronic books may also be distributed on storage media such  
16 as a CD-ROM, a floppy disk, a PCMCIA card, or a number of other data storage options.

17      The electronic book-on-demand system 1000 allows for a greater selection of  
18 electronic books by the subscriber and limits the amount of communicated electronic  
19 book data that is unnecessary or unneeded. The electronic book-on-demand system 1000  
20 also provides the electronic books to the subscriber in a much more timely fashion than  
21 other techniques.

22      The electronic book-on-demand system 1000 may use the distribution site 1020  
23 with sophisticated equipment to access and spool out the electronic books. This can be  
24 accomplished using a file server 1024 for storing the electronic books and distribution  
25 technology such as cable channel modulators 1028, ATM 1029' or telephone-type  
26 switching 1030 to distribute the electronic books. The file server 1024 and distribution  
27 technology that may be used in configuring the electronic book-on-demand system 1000  
28 is described in U.S. Patent No. 5,262,875 and U.S. Patent 5,218,695, cited above.

1           In addition to electronic books, the electronic book-on-demand system 1000 of  
2 Figure 18a may support distribution of nearly any digital data. Books or textual files may  
3 be received from a publisher 282 and other sources through local feeds 1032, ATM 1029,  
4 and by satellite dish 1036, for example. The data is then stored in a memory 1040 at the  
5 file server 1024. In an embodiment, the distribution site 1020 is a cable headend that  
6 receives requests from subscribers and delivers text to subscribers over a one-way or a  
7 two-way communication system (such as the two-way cable 1044).

8           Figure 18b is an expanded view of a distribution site 1020 that supports the  
9 electronic book-on-demand system 1000. The distribution site 1020 supports multiple  
10 feeds to receive digital information by tape 1060, magnetic storage 1060', the ATM 1029,  
11 and the satellite 1036, for example. The information may be processed through an input  
12 multiplexer 1064 and a small file server 1068 before reaching a master file server 1072.  
13 Digital data such as electronic books received from the publishers 282 then may be stored  
14 on the master file server 1072. The digital data may be stored in a standard compressed  
15 format, such as PKZIP, for example.

16           A system controller 1076 provides control over the electronic book-on-demand  
17 system 1000. Electronic books may be packaged into groups to provide feeds to various  
18 regional distributors. In addition, scheduling and marketing research may be conducted  
19 at the distribution site 1020. In order to handle the scheduling and market research,  
20 electronic book buy data may be received at the distribution site 1020 through a  
21 multiplexer 1082. Electronic book buy information may be provided by the distribution  
22 site 1020 to the billing and collection system 278. This data may be used to determine  
23 which electronic book should be broadcast more frequently.

24           The system 1000 may also be coupled to a virtual book-on-demand system (not  
25 shown in Figures 18a and 18b). The virtual book-on-demand system functions to deliver  
26 books to subscribers in a manner that appears to be on demand, but that in reality uses  
27 some type of delayed delivery mechanism. The virtual book-on-demand system may  
28 send a signal to the system 1000 to delivery, or broadcast, one or more electronic books

1 to subscribers as a part of the virtual on-demand process. A virtual book-on-demand  
2 system will be described in detail later.

3 The distribution site 1020 also may be equipped to insert messages or  
4 advertisements into the file server. These messages or advertisements will eventually be  
5 received by the subscribers.

6 The master file server 1072 uses an output multiplexer 1080 and the ATM 1029'  
7 as well as satellite connections to distribute digital data. In an embodiment, the  
8 distribution site 1020 is a national distribution site and regional distributors 1022 receive  
9 digital data from the master file server 1080 through the output multiplexer 1080 and the  
10 ATM 1029'. After receiving the electronic books, the regional distributors 1022 store the  
11 electronic books in a local file server 1024.

12 The system controller 1076 includes control software 264 and an instruction  
13 memory to accomplish the processing capabilities of the distribution site 1020. Figure  
14 19a illustrates the various levels of processing capabilities that can be performed by the  
15 system controller 1076. Specifically, Figure 19a illustrates an example of the processing  
16 routines 264' that are included within the control software 264.

17 As shown in Figure 19a, the processing routines 264' include a Main Program  
18 1281 that calls a Reception routine 1283 as subscriber communications are received. The  
19 first level of processing involves identifying the subscriber request 1285. This level of  
20 processing can use a Book Request routine 1293 and a Menu Request routine 1295 as  
21 well as other routines 1297 for other data requests. The second processing level involves  
22 processing the subscriber request 1287. This second processing level may make use of  
23 several routines, including a near electronic book-on-demand (NBOD) routine 1299, a  
24 virtual electronic book-on-demand (VBOD) routine 1301. The NBOD routine 1299 may  
25 be used to process electronic book orders with a resulting slight time delay, from a few  
26 minutes to a few hours, for example, between order and delivery. The VBOD routine  
27 1301 may be used to process electronic book orders so that subscribers experience no  
28 perceptible delay between order and delivery of an electronic book. The second

1 processing level may also include an advertisement targeting routine 1303, an interactive  
2 electronic book routine 1305, and an electronic book suggestion routine 1307. The third  
3 level of processing involves locating the data that corresponds to the subscriber's  
4 communication or request 1289. Typically, this third processing level may involve the  
5 use of a Standard Menus routine 1309 and/or a Custom Menus routine 1311. The final  
6 processing level involves sending the data located in the previous step to the subscriber  
7 1291. This final level of processing can involve a Spool Data routine 1313 and a Text  
8 Overlay routine 1315.

9 Using such a set of processing levels, the system controller 1076 can use its  
10 control software 264 and processing routines 264' to: identify the type of subscriber  
11 request 1285 received in the subscriber communications; process the subscriber's request  
12 1287 to determine the data to reply to the identified subscriber request; locate the reply  
13 data corresponding to the subscriber's request 1289; and send the located reply data to the  
14 subscriber 1291 for local processing by the subscriber's set top terminal. Figure 19a  
15 provides only an example of the various processing capabilities available within the  
16 distribution site 1020 and those skilled in the art will recognize that a number of other  
17 variations in processing levels and routines are feasible.

18 Although other routines are feasible, the routines identified in Figure 19a can be  
19 used to perform system controller 1076 monitoring and management functions. The  
20 Reception routine 1283 is the initial routine called by the Main Program 1281 upon  
21 receiving a subscriber communication. The Reception routine 1283 can be used to  
22 interpret the subscriber communication. The Reception routine 1283 designates the type  
23 of subscriber communication as an electronic book request, a menu request or, a data  
24 services request. Depending on the type of request, the Reception routine 1283 calls  
25 either a Electronic Book Request routine 1293, a Menu Request routine 1295, or an Other  
26 Data Requests routine 1297.

27 With reference to Figures 18b and 19a, the Electronic Book Request routine 1293  
28 is one of the routines that identifies the type of request carried by the communications

1 from a subscriber. The Program Request routine 1293 is called by the Reception routine  
2 1283, 1283' for all subscriber communications that are related to delivery of an electronic  
3 book. The Program Request routine 1283, 1283' identifies the type of electronic book  
4 request in real time as a NBOD request, a VBOD request, an interactive electronic book  
5 request, and/or a request that may be used in the targeting of advertisements to a  
6 subscriber. The Electronic Book Request routine 1293 identifies the request and calls the  
7 appropriate routine to process the electronic book request.

8 The Menu Request routine 1295 is another routine that identifies the type of  
9 request carried by the communications received from a subscriber. The Menu Request  
10 routine 1295 is called by the Reception routine 1283 for all subscriber communications  
11 that are menu related. The Menu Request routine 1295 identifies the type of menu  
12 request in real time as a standard menu or a custom menu. The Menu Request routine  
13 1295 identifies the request and calls the appropriate routine to process the menu request.

14 The NBOD routine 1299 is one of the routines that can process an electronic book  
15 request. The NBOD routine 1299 is called by the Electronic Book Request routine 1293  
16 in order to process a request for a NBOD. The NBOD routine 1299 determines whether  
17 a menu or an electronic book will be provided in response to the subscriber request.  
18 Where an electronic book is to be provided, the routine determines the transmission  
19 medium for transmission of the requested electronic book. The subscriber will  
20 subsequently be sent data that verifies the subscriber's terminal is coupled to that  
21 transmission medium. The NBOD routine 1299 calls the appropriate routine to locate  
22 and/or send the response to the subscriber.

23 The VBOD routine 1301 is another routine that processes an electronic book  
24 request. The VBOD routine 1301 is called by the Electronic Book Request routine 1293  
25 in order to process a request for VBOD. The VBOD routine 1301 determines whether  
26 a menu or an electronic book will be displayed in response to the subscriber request. The  
27 VBOD routine 1301 calls the appropriate routine to locate and/or send the response to the  
28 subscriber.

1           The Advertisement Targeting routine 1303 is a routine that generates packages  
2 of commercials and advertisements geared towards particular subscribers. The  
3 Advertisement Targeting routine 1303 may make use of a subscriber's demographic  
4 information and/or reading habits to determine those advertisements that are of most  
5 interest to that particular subscriber. In so doing, the routine 1303 outputs packages of  
6 advertisements targeted towards each subscriber.

7           The Interactive Electronic Book routine 1305 is another routine that may process  
8 an electronic book request. The Interactive Electronic Book routine 1305 is called by the  
9 Electronic Book Request routine 1293 in order to process a request for an interactive  
10 electronic book. The Interactive Electronic Book routine 1305 makes use of a look-up  
11 table that pre-stores all possible subscriber answers to interactive questions posed by the  
12 interactive electronic book. The use of a look-up table enables the routine to process  
13 subscriber communications and determine a message or electronic book response that can  
14 be rapidly generated in order to perform real time interactivity.

15           The Electronic Book Suggestion routine 1307 is a routine that responds to a menu  
16 request 1295. The Electronic Book Suggestion routine 1307 generates particular menus  
17 displaying programs for subscriber selection that are geared towards particular  
18 subscribers. The Electronic Book Suggestion routine 1307 may use a subscriber's  
19 demographic information and/or reading habits to determine those electronic book or  
20 electronic book categories that can be suggested to the subscriber. The routine may also,  
21 for example, make use of text searches of electronic book abstracts or query the  
22 subscriber for mood in order to determine a suggestion. Thus, the Electronic Book  
23 Suggestion routine 1303 can determine whether electronic book data or a menu should  
24 be sent to the subscriber in order to carry out the suggestion process.

25           Once one of the above routines that processes requests has been run, one of  
26 routines that can be used to locate data and generate menus can be called. The Standard  
27 Menus routine 1309 is a routine that is used to locate data in the file server 1072 and  
28 generate a standard or generic menu that can be sent to any subscriber. The Standard

1 Menus routine 1309 makes use of menus that are pre-stored in the file server 1072. The  
2 Standard Menus routine 1309 locates the data for the pre-stored menus so that the located  
3 data for the menu can be subsequently sent to a subscriber.

4 The Custom Menus routine 1311 is a routine that is used to locate data and  
5 generate a custom menu that is to be sent to a specific subscriber. Because the custom  
6 menu must be rapidly created and sent to the subscriber, the Custom Menu routine makes  
7 use of a standardized menu format having pre-stored background sections so that video  
8 data, such as MPEG 2 data streams, and future MPEG data streams or other encoded data  
9 streams can be built for sections of the menu screen in anticipation of the subscriber's  
10 communication. In conjunction with the pre-stored menu sections, the routine also makes  
11 use of a look-up table that can be used to generate text messages of pre-determined  
12 lengths. The routine can then insert or interleave the generated text messages with the  
13 pre-built data streams in order to generate a customized menu screen in real time.  
14 Alternatively, the menu screen can be built in full and text messages overlaid using text  
15 overlaying techniques.

16 Once a menu has been located or generated or an electronic book request has been  
17 otherwise processed, the MPEG 2 data stream or the encoded data stream located or  
18 generated must be sent to a subscriber. The Spool Data routine 1313 is a routine that is  
19 used to spool such located or generated data. The Spool Data routine 1313 prompts the  
20 file server 1072 to send the located or generated data to the subscriber.

21 The Electronic Book Suggestion routine 1315 is another routine that can be used  
22 to send the located or generated data to a subscriber. This routine allows data to be sent  
23 to a subscriber in the form of text that can be overlaid on a menu or an electronic book.  
24 The routine accommodates both methods of (i) sending text embedded in a signal  
25 carrying the menu data, which enables a terminal with a text generator to process the  
26 signal and text message and overlay the text onto the menu; and (ii) generating a text  
27 message and inserting the text message at the distribution site 1020 into the signal that  
28 carries the menu data before the signal is distributed to the terminals.

1        In addition to the above routines, many other routines 1297 may be used by the  
2 system controller 1076 in performing its processing functions. For example, an Account/  
3 Billing routine may be run to generate billing reports for each terminal. Those skilled in  
4 the art will recognize a number of other routines and processing flows that can be used  
5 to perform the same functions.

6        Figure 19b provides a sample decision tree 264" for the various processing  
7 routines 1264' that are depicted in Figure 19a. The sample decision tree 264" illustrates  
8 the steps that the system controller 1076 may perform in processing subscriber  
9 communications. For example, where a subscriber is reading an interactive electronic  
10 book and wishes to respond to a question included in the interactive electronic book, the  
11 subscriber's answer could be received by a Receive Subscriber Communications routine  
12 1283'. This routine 1283' would interpret the subscriber's communication and identify  
13 the subscriber's answer as an electronic book request, calling the Electronic Book  
14 Request routine 1293.

15       The Electronic Book Request routine 1293 could, in turn, call the Interactive  
16 Electronic Book routine 1305 in order to process the subscriber's request. The data  
17 corresponding to the response to the subscriber's request (or "answer" in this example)  
18 would then be located and spooled for distribution to the subscriber by the spool data  
19 routine 1313. If the response to the subscriber's answer processed by the Interactive  
20 Electronic Book routine 1305 requires the use of a menu or another method for  
21 generating a question to the subscriber, the Menus routine 1317 would be called before  
22 the data is spooled by the Spool Data routine 1313 or the question is overlaid on the  
23 interactive electronic book using the Text Overlay routine 1315. The decision tree 264"  
24 in Figure 19b allows all subscriber communications and/or requests to be processed by  
25 the various routines 264' that are used with other distribution site 1020 components.  
26 Other embodiments of an interactive electronic book are described in detail in copending  
27 patent application Serial No.09/289,958, entitled INTERACTIVE ELECTRONIC  
28 BOOK, filed April 13, 1999, the disclosure of which is hereby incorporated by reference.

1           As noted above, the Spool Data routine 1313 prompts the file server 1072 to send  
2 data to a terminal such as the terminal 601a. In an embodiment, the Spool Data routine  
3 1313 prompts the file server 1072 to send a first portion of the requested electronic to the  
4 subscriber. In an embodiment, the first portion may correspond to the first chapter of the  
5 electronic book, plus any preface or other introductory matter. The duration of  
6 transmission for the first portion may be short. In an embodiment, the first portion can  
7 be transmitted from the distribution site 1020 in real-time. In another embodiment, the  
8 first portion may be downloaded from the distribution site 1020 or the operations center  
9 250 to the terminal 601a on a periodic or cyclical basis. If downloaded, the terminal 601a  
10 may display the first portion of the electronic book by retrieving the first portion from  
11 memory. The terminal 601a would then send a signal to the distribution site 1020  
12 requesting that the remainder of the selected electronic book be delivered to the terminal  
13 601a from memory. In operation, the subscriber would select a desired electronic book  
14 preferably from a menu of available electronic books. If the first portion of the desired  
15 electronic book has been delivered to and stored in the terminal 601a, the terminal 601a  
16 will decrypt and display the selected electronic book. The terminal 601a may then  
17 transmit an electronic book order to the distribution site 1020.

18           In an embodiment, first portions of electronic books may be broadcast or provided  
19 to subscribers using various means. In this embodiment, remaining portions of the  
20 electronic books may be linked electronically using an electronic link system, which will  
21 be described in detail in Section VIII.

22           Upon receiving the electronic book request, the system controller 1076 at the  
23 distribution site 1020 directs the file server 1072 to retrieve a remaining portion of the  
24 requested electronic book. The file server 1072 then sends the remaining portion of the  
25 requested electronic book to the terminal 601a. Alternatively, the file server 1072 may  
26 retrieve and send the entire electronic book. Upon receipt at the terminal 601a, the entire  
27 electronic book may be stored in memory, and may overwrite the first portion of the

1 electronic book or may overwrite other electronic books or portions of electronic books  
2 stored in memory.

3 In another embodiment, the remaining portion of the requested electronic book  
4 is retrieved from an archive 275, which can be remotely located. Examples of archives  
5 include a library, an off-site storage, a repository, a central server, and an electronic  
6 bookstore coupled to the distribution site 1020 and the terminal 601a by a  
7 telecommunications network, including the Internet. The remaining portion of the  
8 requested electronic book is transmitted from the archive 275 directly to the terminal  
9 601a. Alternatively, the remaining portion is transmitted to the distribution site 1020.  
10 The distribution site 1020 stores the remaining portion in the memory 1040. The  
11 distribution site 1020 then transmits the remaining portion to the terminal 601a using a  
12 high speed data path, such as the data path 1044 shown in Figure 18a. Other examples  
13 of such data paths include various ATM networks, satellite transmissions, fiberoptics,  
14 personal communications networks, wireless communications, cellular networks,  
15 telephone lines, and similar technologies.

16 Figure 20a shows another embodiment of an on-demand electronic book system  
17 1001 that may be used to distribute electronic books. Original content providers such as  
18 the content provider 282 send electronic books to a distribution site. The content  
19 provider may be a book, newspaper or magazine publisher, for example. The distribution  
20 site could be the operations center 250 of a cable television or satellite television delivery  
21 system. The content providers could also send the electronic books to an electronic book  
22 club 283 or make the electronic books available using the Internet web site 279. The  
23 electronic book club 283 also may deliver electronic books to subscribers using the  
24 Internet web site 279 or the operations center 250, for example. The content provider 282  
25 also may send books to a conversion facility 282' that converts hard-copy text and  
26 graphics into digital data that forms the electronic book. While Figure 20 shows the  
27 content provider 282, the conversion facility 282', the electronic book club 283 and the

1 operations center 250 as separate components of the electronic book-on-demand system  
2 1001, one or more of these components may be co-located.

3 Orders for electronic books are received at a remote location such as the  
4 operations center 250. The orders could alternately be received at other remote locations  
5 such as the cable television headend 251, electronic bookstores 252', libraries 254, the  
6 Internet web site 279, a regional distributor 253, the billing and collection system 278,  
7 or any other remote location. For example, a subscriber using the home system 258 could  
8 send an electronic book order using the telecommunications network 255 to the library  
9 254, the electronic book store 252', the Internet web site 279 or the operations center 250.  
10 The telecommunications network 255 may be any network capable of two-way  
11 communications, including a public switched telephone network (PSTN) and a local area  
12 network (LAN), for example. Alternate delivery and ordering paths are described in  
13 detail in copending U.S. Patent Application Serial No. 09/289,957, entitled  
14 **ELECTRONIC BOOK ALTERNATIVE DELIVERY SYSTEMS**, filed April 13, 1999,  
15 the disclosure of which is hereby incorporated by reference.

16 Figure 20b shows an embodiment of an electronic book-on-demand system 300  
17 that operates through the Internet web site 279. The system 300 includes an electronic  
18 book content database 308 on which are maintained electronic files of data corresponding  
19 to hard copy books, magazines, newspapers and other printed materials. A transactions  
20 database 309 maintains information related to subscriber orders, billing and related  
21 information. The transaction database 309 may also contain subscriber profiles and other  
22 subscriber-specific data, including demographic data and subscriber-entered data, for  
23 example. A server platform 303 provides for receipt of electronic book orders,  
24 processing, and delivery of electronic books to subscribers through the Internet web site  
25 279. The server platform 303 may include a delivery server 304, a transaction server 305  
26 and a web server 307.

1        The web server 307 provides access by subscribers using Internet communications  
2        including, for example, returning a web page when subscribers access the Internet web  
3        site 279.

4        The transaction server 305 receives electronic book orders from the web server  
5        307. The transaction server 305 then performs several operations, such as verifying the  
6        status of a subscriber, verifying a personal identification number (PIN), if used, checking  
7        the subscriber account balance, or processing the subscriber's payment, recording the  
8        transaction, including the specific electronic book ordered, and providing an  
9        authorization code to the delivery server 304. The transaction server 305 may also format  
10       and provide messages to the subscriber, including statements of accounts, messages  
11       indicating the status of an electronic book order and other electronic mail messages  
12       related to the operation of the system 300.

13       The delivery server 304 receives the electronic book order from the web server  
14       307 and the authorization code and other data from the transaction server 305. The  
15       delivery server 304 retrieves the ordered electronic book from the electronic book content  
16       database 308 and prepares the ordered electronic book for delivery to the subscriber  
17       through the Internet web site 279. This preparation may include formatting, compression,  
18       and security processing.

19       Figure 20c shows another embodiment of an electronic book-on-demand system.  
20       In Figure 20c, an electronic book-on-demand system 311 is accessed through the Internet  
21       web site 279. The system 311 includes a web server 312 that receives inputs from  
22       subscribers through the Internet web site 279 and returns a web page to the subscribers.  
23       The web server 312 connects to a high speed network 313. The high speed network may  
24       be a local area network, a wide area network on the Internet, for example. Coupled to the  
25       network 313 is a transaction server 315. The functions of the transaction server 315 are  
26       similar to those of the transaction server 305 described with respect to Figure 20b. The  
27       transaction server 315 accesses the transaction database 309 to record information  
28       regarding subscriber electronic book orders and to authorize electronic book orders,

1 initiate billing, and provide messages to the subscribers, as appropriate. The network 313  
2 also connects to a delivery server 314. The functions of the delivery server 314 are  
3 similar to those of the delivery server 304 described with respect to Figure 20b. The  
4 delivery server 314 accesses the electronic book content database 308 to package and  
5 deliver requested electronic book to the subscriber through the Internet web site 279.

6 Figure 20d shows another example of an electronic book-on-demand system. In  
7 Figure 20d, an electronic book-on-demand system 320 receives electronic book orders  
8 from subscribers using the Internet web site 279. The system 320 includes web servers  
9 312, 312' and 312". By using additional web servers, the system 320 may provide faster  
10 service to subscribers requesting electronic books and may be able to handle a greater  
11 number of concurrent requests for electronic books. Although the system 320 is shown  
12 with three web servers 312, 312' and 312", more than or less than three web servers may  
13 be incorporated into the system 320. The web servers 312, 312' and 312" perform the  
14 same functions as the web server 307 described with respect to Figure 20b. The web  
15 servers 312, 312' and 312" are coupled to the delivery server 314 and the transaction  
16 server 315 using the high speed network 313.

17 Figure 20e shows yet another embodiment of an electronic book-on-demand  
18 system. An electronic book-on-demand system 330 receives electronic book orders using  
19 the Internet web site 279. The web servers 312, 312' and 312" function as previously  
20 described with respect to Figure 20d. The web servers 312, 312' and 312" connect to the  
21 high speed network 313. The transaction server 315 and the transaction database 309  
22 also connect to the network 313. The transaction server 315 and the transaction database  
23 309 function as described with respect to Figure 20d.

24 Electronic book-on-demand system 330 differs from previous embodiments in  
25 that three delivery servers 314, 314' and 314" and associated electronic book content  
26 databases 308, 308' and 308" are used to delivery electronic books through the Internet  
27 web site 279 to subscribers. To optimize performance of the electronic book-on-demand  
28 system 330, the electronic book content databases 308, 308' and 308" may store the same

1 electronic books for delivery. In this arrangement, should the delivery server 314 reach  
2 capacity, the delivery server 314', for example, could begin sending electronic books to  
3 the subscribers. If both the delivery servers 314 and 314' reach capacity, then the delivery  
4 server 314" could begin sending electronic books to the subscribers.

5 In an alternate arrangement, the electronic books to be delivered to the subscribers  
6 by the electronic book-on-demand system 330 could be split among the electronic book  
7 content databases 308, 308' and 308". For example, the electronic book content databases  
8 308, 308' and 308" could each store one-third of the available electronic books in the  
9 electronic book-on-demand system 330. Other schemes may also be used, such as storing  
10 the most popular content at the electronic book content database 308, technical  
11 documents such as electronic text books and less popular works on the electronic book  
12 content database 308', and electronic magazines and newspapers at the electronic book  
13 content database 308". Still other electronic book content storage schemes are available  
14 to optimize electronic book-on-demand system 330.

15 To further optimize performance of the electronic book-on-demand system 330,  
16 the system could connect to one or more high speed computer systems such, as the system  
17 319. Should the electronic book-on-demand system 330 reach capacity, servers (not  
18 shown) in the computer system 319 can assume the processing and delivery functions of  
19 the delivery servers 314, 314' and 314". When the peak demand has subsided, the  
20 computer system 319 would cease the processing and delivery functions. Thus, by  
21 sharing resources with other high speed computer systems, the electronic book-on-  
22 demand system 330 can meet demand, even when that demand exceeds system capacity.

23 In any electronic system used for delivery of electronic books, some processing  
24 delays may occur from the time an electronic book order arrives at a remote location such  
25 as the operations center 250 shown in Figure 2. Figure 21a shows an electronic book-on-  
26 demand system 1002 that may be used for near real-time processing and delivery of  
27 electronic books. The system 1002 includes a processor or server 1010 that processes the  
28 electronic book orders. A queue 1012 stores pending electronic book orders that await

1 processing by the server 1010. If the server 1010 is available for processing, the  
2 electronic book order will be serviced immediately. Otherwise, the electronic book order  
3 may enter the queue 1012 to await availability of the server 1010. When the server 1010  
4 becomes available, an electronic book order leaves the queue 1012 and is serviced.  
5 Queues, such as the queue 1012, may be any type of queue such as a first-in-first-out  
6 (FIFO) queue, for example. Alternately, the system 1002 could include more than one  
7 queue. Then, one or more of the queues may operate on a priority basis so that orders for  
8 certain electronic books or orders placed by certain subscribers may be placed in a higher  
9 priority queue that will be accessed in preference to lower priority queues.

10 A well-known queuing model may be used to explain the fundamental operation  
11 of the electronic book on demand system 1002. To describe the basic queuing model that  
12 determines the operation of the system 1002 shown in Figure 21a some fundamental  
13 quantities of interest are:

14 L, the average number of orders in the system 1002;

15  $L_Q$ , the average number of orders in a queue;

16 W, the average amount of time an order spends in the system 1002;

17  $W_Q$ , the average amount of time that an order spends waiting in a queue.

18 Different models may be created to describe processing of electronic book orders.  
19 The simplest model assumes a single server that is able to process the electronic book  
20 orders in a serial fashion. Electronic book orders enter the system 1002, and are either  
21 immediately processed for delivery, entered into the queue 1012, or are not retained in  
22 the system 1002, possibly because the capacity of the queue 1012 is exceeded.

23 Figure 21a illustrates a single server model in which the electronic book orders  
24 arrive at the system 1002 with a Poisson process having rate  $\lambda$ . That is, the times  
25 between successive arrivals are independent exponential random variables having a mean  
26  $1/\lambda$ . Each electronic book order, upon arrival at the system 1002, goes directly into the  
27 server 1010 if the server 1010 is available for processing. If the server 1010 is not  
28 available for processing, the electronic book order goes into the queue 1012. The server

1 1010 is considered available for processing if it is not currently processing an electronic  
2 book order for delivery.

3 The server 1010 processes an electronic book order at a rate  $\mu$ . When the server  
4 1010 finishes processing the electronic book order, an electronic book leaves the system  
5 1002, and the next electronic book order in the queue 1012, if any, enters the server 1010.  
6 Successive service times are assumed to be independent exponential random variables  
7 having a mean  $1/\mu$ .

8 The above queuing model may be called a memoryless or Markovian model  
9 because both the interarrival and service distributions are exponential. Such a model may  
10 be defined by the states that are allowable. Figure 21b shows a simplified state machine  
11 1050 for the system 1002 having the single server 1010 and the single queue 1012. The  
12 system 1002 may operate in one of several states. In state 1051, there are no orders in the  
13 system 1002. When a first order is received in the system 1002, the state machine 1050  
14 transitions to state 1052. The transition to state 1052 occurs at the rate  $\lambda$ , which is the  
15 rate associated with arrival of orders in the system 1002. In state 1052, since there is only  
16 the first order in the system 1002, the server 1010 immediately begins processing the first  
17 order at the rate  $\mu$ . If the server 1010 completes processing of the first order before  
18 another electronic book order enters the system 1002, the state machine 1050 transitions  
19 back to state 1051. As shown in Figure 21b, the transition back to the state 1051 occurs  
20 at a rate  $\mu$ , which is just the rate of processing the electronic book order in the server  
21 1010.

22 From state 1052, the state machine 1050 may also transition to state 1053. In  
23 state 1053, the first electronic book order is being processed by the server 1010, and  
24 during the processing, a second order arrives at the system 1002. The second order  
25 cannot be processed, and so enters the queue 1012.

26 From the state 1053, the state machine 1050 can transition to the state 1052 at the  
27 rate  $\mu$ , when the server 1010 completes processing the first electronic book order before  
28 an arrival of a third electronic order. The state machine 1050 may also transition to the

1 state 1054 at the rate  $\lambda$ , which occurs when a third order arrives in the system 1002 before  
2 the server 1010 completes processing the first electronic book order. In the state 1054,  
3 the third electronic book order enters the queue 1012 to await processing.

4 To compute the expected amount of time that an electronic book order remains  
5 in the system 1002, an average number of electronic book orders is simply divided by the  
6 arrival rate, or:

7  $W = L/\lambda$  Equation 1.

8 Equation 1 assumes that all electronic book orders that arrive at the system 1002 are  
9 processed by the server 1010.

10 In the state machine 1050 shown in Figure 21b, all arriving electronic book orders  
11 are either immediately processed by the server 1010, or enter the queue 1012. However,  
12 if the queue 1012 has a finite capacity, some arriving electronic book orders may not be  
13 processed by the server 1010 and may not enter the queue 1012. These electronic book  
14 orders could therefore be “lost” in a manner analogous to a man entering a barber shop  
15 who sees all chairs filled and too many customers waiting and therefore decides to leave  
16 the barbershop. The system 1002 may therefore be designed to process orders (i.e., have  
17 sufficient server capacity) and store pending orders (i.e., have sufficient storage capacity  
18 in the queues) so that all electronic book orders that enter the system 1002 eventually are  
19 processed by the server 1010. Server capacity may be increased by adding additional  
20 servers, for example. Additional servers and queue capacity would be added as needed  
21 to prevent any lost orders.

22 Figure 22a shows an electronic book delivery system 1003 in which two servers  
23 are used to process electronic book orders. In Figure 22a, the server 1010 and a second  
24 server 1011 may receive electronic book orders, and provide electronic books. If both  
25 servers 1010 and 1011 are processing orders, any subsequent electronic book orders will  
26 enter the queue 1012. When a server is available, the electronic book orders pending in  
27 the queue 1012 may be processed in a FIFO manner, for example.

1       Figure 22b shows a state machine 1070, for use in the system 1003, in which the  
2       two servers 1010 and 1011 are used to process orders. The system 1003 may include a  
3       number of different states related to the number of electronic book orders that are  
4       pending. Electronic book orders arrive at a rate  $\lambda$  and are processed at a rate  $\mu$ . In state  
5       1071, the system 1003 exists with no pending electronic book orders. The state machine  
6       1070 may remain in state 1071 or transition to state 1072 with probability, or rate,  $\lambda$ . In  
7       state 1072, the system 1003 exists with a first electronic book order, which is  
8       immediately processed by the server 1010. From the state 1072, the state machine 1070  
9       may return to the state 1071 with probability  $\mu$ , the rate of processing an electronic book  
10      order in the system 1003. The state machine 1070 returns to the state 1071 if the first  
11      electronic book order is processed before the arrival of a second electronic book order.  
12      If the second electronic book order arrives at the system 1003 while the first electronic  
13      book order is being processed, the state machine transitions to state 1073, and the server  
14      1011 begins processing the second electronic book order. From the state 1073, the state  
15      machine 1070 may transition to the states 1071, 1072 or to state 1074. The state machine  
16      1070 transitions to the state 1074 if a third electronic book order arrives at the system  
17      1003 while the first and the second electronic book orders are being processed. In the  
18      state 1074, the third electronic book enters the queue 1012 because no servers are  
19      available. The state machine 1070 transitions to the state 1071 if the processing of the  
20      first and the second electronic book orders completes at the same time. The transition  
21      probability  $\mu'$  from state 1073 to 1071 may be the same as, or different from the transition  
22      probability  $\mu$ . Otherwise, the state machine transitions to the state 1072, with one  
23      electronic book order (either the first or the second) remaining in the system 1003 and  
24      being processed. The process continues through state 1075 and subsequent states,  
25      assuming the queue 1012 has an infinite capacity or that the arrival rate  $\lambda$  is greater than  
26      the processing rate  $\mu$ . That is, electronic book orders are processed slower than they  
27      arrive.

1           In an electronic book delivery system, electronic book orders may undergo more  
2           than one distinct processing step. That is, an electronic book order may enter an  
3           authorization subsystem, and may be queued in that system. After processing in the  
4           authorization subsystem, the electronic book order may arrive at a processing subsystem  
5           and be queued at the processing subsystem.

6           In the discussion above regarding Figures 21a to 22b, the servers 1010 and 1011  
7           were considered to be unavailable for processing any electronic book orders arriving at  
8           the electronic book delivery system if the servers 1010 and 1011 were engaged in  
9           processing an existing electronic book order. That is, the servers 1010 and 1011 could  
10           only process one electronic book order at a time. In an embodiment, a server may  
11           process many electronic book orders in parallel. That is, a server may include several  
12           parallel processors that execute tasks associated with filing an electronic book order. For  
13           example, a server may include several parallel processors tied to a common processor  
14           bus. The processor bus is coupled to a memory controller and to one or more  
15           input/output (I/O) controllers. However, the server may have a finite capacity. The  
16           server models shown in Figures 21a to 22b apply equally to the situation in which the  
17           server processes several electronic book orders simultaneously.

18           As described above, to ensure that all received electronic book orders are  
19           processed, the electronic book delivery system may incorporate a buffer, or queue. The  
20           queue stores electronic book orders that have entered the system while the processing  
21           system is occupied processing other electronic book orders. The memory capacity of the  
22           queue may be chosen so that no electronic book orders are “lost.” However, such a queue  
23           may need to have a prohibitively large capacity. The queue capacity could also be chosen  
24           based on market surveys or other information that indicates what a peak load on the  
25           system may be. If the expected peak load is exceeded, then electronic book orders may  
26           be lost. Alternatively, the system may incorporate switching features that use extra  
27           memory capacity in other memory areas of the system, or in other connected systems.  
28           For example, if the queue fills, the processor may signal intermediate delivery modules

1 not to accept (not to forward) the electronic book order. In this example, cable headends,  
2 such as the cable headend 251 shown in Figure 18b, for example, may store pending  
3 electronic book orders until the operations center 250 signals that it is again available to  
4 receive requests. The operations center 250 may provide a confirmation menu to the  
5 ordering terminal, such as the home system 258, that indicates how much time is  
6 expected before the delivery of the electronic book can be completed.

7 In another embodiment, a processor associated with the electronic book delivery  
8 system, such as the systems 1002 and 1003, could survey orders in a queue to determine  
9 if any orders were for a same electronic book. In this case, a server could process all such  
10 orders for the same electronic book at one time. The electronic books could then be  
11 distributed to the multiple requesting subscribers using broadcast distribution and  
12 addressing. The broadcast electronic books may also be encoded on a per user bases to  
13 provide security from unauthorized use. For example, the broadcast electronic book may  
14 be encoded such that it can be decrypted by any of the targeted users having an  
15 appropriate decryption key.

## 16 VII. Virtual On-Demand Electronic Book Delivery System and Method

17 The systems described above work well to distribute electronic books in a pull-  
18 type arrangement, i.e., a system in which subscribers initiate all electronic book orders.  
19 In a push-type electronic book delivery system, content, in the form of one or more  
20 electronic books and other related data, may be continually or periodically sent, or  
21 broadcast, to subscribers.

22 A virtual on-demand electronic book (VBOD) system includes mechanisms for  
23 providing content, or electronic books, from centralized sources to terminals, such as the  
24 terminals 601a, 601b, or 601c, which may include the viewer 266 and the library 262.  
25 The general approach to providing the content may follow two fundamental models.  
26 First, popular content may be broadcast on a cyclical basis and may be available to  
27 multiple subscribers at any time. Popular content may be content that is requested by a  
28 large number of subscribers or is promoted heavily by content providers. Second, less-

1 popular content may be transmitted upon specific request by subscribers. For example,  
2 an electronic version of a New York Times "best seller" may be transmitted cyclically  
3 while an electronic version of an obscure classroom textbook may be transmitted only on  
4 request by a specific subscriber. In this model, content can be viewed as a queuing  
5 model, where the broadcast medium (or media) services the queued content elements.  
6 As with any queued system, there are queuing delays from the time an element is  
7 requested until the element can be sent. These delays are variable, based on the number  
8 of elements queued and the number of concurrent or overlapping requests to queue new  
9 elements. As such, during non-busy times, requests for specific content are likely to be  
10 serviced on-demand, that is, there will be a very small delay due to queuing. However,  
11 with traditional approaches, at busy times the delay may be substantial, and the service  
12 may not be able to meet the subscriber's expectation of on-demand service.

13 By moving the content from a central broadcast point to the electronic book  
14 viewer 266 or the library 262, the queuing delay problem may be avoided. For example,  
15 if a subscriber's electronic book viewer 266 or library 262 was downloaded with all of the  
16 popular content, the subscriber would have true on-demand access to this content without  
17 the need to download the content upon subscriber request. Actual access to the content  
18 could still be controlled by use of an access code, for example, such that the subscriber  
19 would have to pay for the content (i.e., the electronic book) and receive an authorization  
20 code from the content provider in order to view a specific electronic book.

21 In an alternative embodiment, a selection of electronic books could be broadcast  
22 to a requester or subscriber and stored in the viewer 266. The subscriber could then  
23 access one or more of electronic books from the selection of electronic books. By  
24 accessing an electronic book from the selection of electronic books, the subscriber may  
25 then register an electronic book sales transaction. The transaction is stored in memory  
26 in the viewer 266 until the next time the viewer communicates with the electronic book  
27 delivery system, or alternatively, with the billing and collection system 278. Software in

1 the viewer's microprocessor may then initiate a message that is transmitted to the  
2 electronic book delivery system, thereby finalizing the sales transaction.

3 Although the approach of mass broadcasting may work well from a subscriber's  
4 perspective, the approach may require extensive storage capacity in the electronic book  
5 viewer 266 or library 262.

6 In an alternate embodiment, the electronic book viewer 266 could be provided  
7 with the first "n" pages of content from each popular electronic book (a "First Section"  
8 or "Auxiliary Section" rather than the entire electronic book). A subscriber could begin  
9 accessing the content immediately, while the remaining content (a "Section Section" or  
10 "Main Section") is queued for transmission (or captured as a cyclical transmission by the  
11 viewer 266) based on the subscriber's interest in the content.

12 This alternate embodiment may use the approach of broadcasting the first section  
13 of multiple content elements, storage of the first sections in the electronic book viewer  
14 266 or library 262, and subsequent queuing and reduced cyclical broadcasting of content  
15 in a background mode rather than an on-demand mode. True on-demand broadcasts are  
16 then reserved for the first sections of less-popular (i.e., content that does not warrant any  
17 cyclical broadcasting) electronic books specifically requested on-demand by electronic  
18 book system subscribers or requesters.

19 Figure 23a shown an embodiment of an electronic book delivery system 1080 that  
20 can provide electronic books in a virtual on-demand manner. The viewer 266  
21 communicates using communication path 1083 with an auxiliary module 1081. The  
22 auxiliary module 1081 includes an auxiliary memory 1086 and an auxiliary  
23 interface/processor 1087. The auxiliary module 1081 communicates with a main module  
24 1082 using communication path 1084. The main module 1082 includes a main memory  
25 1088 and a main interface/processor 1089. The auxiliary module 1081 may provide  
26 "Auxiliary Sections," or "First Sections," of electronic books to the viewer 266 using the  
27 communications path 1083. The auxiliary section of the electronic book may be the first  
28 chapter of the electronic book, for example. The auxiliary module 1081 may provide the

1 auxiliary sections to the viewer 266 upon a request from the viewer 266 transmitted over  
2 the communication path 1083. Alternately, the auxiliary module 1081 may broadcast  
3 selected auxiliary sections of electronic books using the auxiliary interface/processor  
4 1087 and the communications path 1083. The auxiliary module 1081 may also receive  
5 requests from the viewer 266 for one or more specific main sections of electronic books.  
6 The main sections of the electronic books may correspond to auxiliary sections of  
7 electronic books already received by the viewer 266. Alternately, the main sections of  
8 the electronic books may be selected from a menu provided to the viewer 266 by the  
9 auxiliary module 1081.

10 Upon receiving a request for a main section of an electronic book, the auxiliary  
11 module 1081 communicates with the main module 1082 using the communication path  
12 1084. The main sections of the electronic books are stored in the main memory 1088.  
13 The main interface/processor 1089 receives the request for the main section, retrieves the  
14 main section from the main memory 1088 and sends the main section to the auxiliary  
15 module 1081. The auxiliary interface/processor 1087 then transmits the requested main  
16 section to the viewer 266. As shown in Figure 23a, the auxiliary module 1081 and the  
17 main module 1082 may be separate components of the electronic book delivery system  
18 1080. However, the auxiliary module 1081 and the main module 1082 may be co-  
19 located. Additionally, the auxiliary memory 1086 and the main memory 1088 may also  
20 be co-located in the same memory device.

21 The communication path 1084 and the communication path 1083 may be any  
22 communication path capable of transmitting electronic book content. For example, the  
23 communication path 1083 may be a telecommunications path such as a telephone  
24 network, a wireless telephone network, a satellite television network, a cable television  
25 network, a broadcast television network or a local area network. The communication  
26 path 1084 may be configured in a manner similar to that of the communication path 1083.  
27 The auxiliary module 1081 or the main module 1082 may be located at a bookstore or a  
28 newsstand. For example, the auxiliary module 1081 and the main module 1082 may be

1 accessed using a kiosk located at a bookstore. The auxiliary module and the main module  
2 may also be accessed by accessing an Internet web site such as the Internet web site 279.  
3 The auxiliary module and the main module may be part of a university library system or  
4 a community library system, for example.

5 Figure 23b shown an alternate arrangement for an electronic book delivery system  
6 1090 providing virtual book-on-demand services. The system 1090 includes the viewer  
7 266 that communicates with an auxiliary module 1091 using the communication path  
8 1093. The auxiliary module includes an auxiliary memory 1096 and an auxiliary  
9 interface/processor 1097. The auxiliary module 1091 communicates with a main module  
10 1092 using the communication path 1094. The main module 1092 includes a main  
11 memory 1098 and a main interface/processor 1099. The viewer 266 also communicates  
12 with the main module using the communication path 1095.

13 In the system 1090 shown in Figure 23b, main sections of electronic books may  
14 be stored in the main memory 1098 and auxiliary sections stored in the auxiliary memory  
15 1096. The auxiliary module 1091 may provide auxiliary sections, or first sections, of  
16 electronic books to the viewer 266. For example, the auxiliary interface/processor may  
17 broadcast auxiliary sections of selected electronic book to the viewer 266. The auxiliary  
18 sections may be broadcast on a periodic basis, such as monthly, for example. The viewer  
19 266 may store the auxiliary sections for a selected time period and a requester or  
20 subscriber, may view the auxiliary sections without incurring a charge. If the subscriber  
21 using the viewer 266 decides to request a specific main section corresponding to one of  
22 the received auxiliary sections, the viewer 266 may be used to transmit a request to the  
23 auxiliary module 1091. Auxiliary module 1091 receives the request at the auxiliary  
24 interface/processor 1097 and transmits the request to the main module 1092. The main  
25 module 1092 receives the request at the main interface/processor 1099. The main  
26 interface/processor 1099 then retrieves the requested main section from the main memory  
27 1098 and provides the requested main section to the viewer 266 using the communication

1 path 1095. Alternately, the viewer 266 can communicate a request for a main section to  
2 the main module 1092 using the communication path 1095.

3 As shown in Figure 23b, the auxiliary module 1091 and the main module 1092  
4 may be separate units. Alternately, the auxiliary module 1091 and the main module 1092  
5 may be co-located. In addition, the auxiliary memory 1096 and the main memory 1098  
6 may be subcomponents of a overall memory unit. Furthermore, the auxiliary  
7 interface/processor 1097 and the main interface/processor 1099 may be subcomponents  
8 of a main interface/processor. In an embodiment, the main module may be located in a  
9 kiosk at a bookstore or newsstand, for example. The auxiliary module may be located  
10 remotely from the book stores, such as at an operations center or television delivery  
11 system or may be accessed through an Internet web site, for example. The main module  
12 1092 may alternately be located at a library, such as a university library or a community  
13 library. Alternately, the main module 1092 may be accessed through a  
14 telecommunications network such as a wired telephone network, a wireless telephone  
15 network, a television network, an Internet web site, a local area network and any other  
16 telecommunications network capable of transmitting electronic book content.

17 Figure 24a shows another VBOD delivery system 1100 used to queue and  
18 prioritize content elements, or electronic books, for transmission from a storage  
19 repository to terminals such as the home systems 258, libraries 254, and electronic  
20 bookstores 252 shown in Figure 19b. The VBOD delivery system 1100 works for all  
21 transmission media and techniques disclosed in copending U.S. patent application Serial  
22 No. 09/289,957, filed April 13, 1999, entitled ELECTRONIC BOOK ALTERNATIVE  
23 DELIVERY SYSTEMS, the disclosure of which is hereby incorporated by reference.  
24 Content storage 1101 stores electronic books, magazines and newspapers, and other  
25 digital data. The content storage 1101 may store data on a digital storage media such as  
26 a hard disc, tape, optical disc and other storage media, for example. A queue section  
27 1110 stores content for delivery to subscribers connected to a network 1103. A processor  
28 section 1104 controls access to the content storage 1101, processing of content in the

1. queue section 1110, and delivery of the content to the subscribers. The processor section  
2. 1104 may monitor electronic book orders to determine if multiple electronic book orders  
3. are for a same electronic book. The processor section 1104 may then aggregate the  
4. multiple electronic book orders, and, using individual addressing, broadcast the electronic  
5. book to multiple subscribers.

6. Figure 24b shows the VBOD delivery system 1100 in more detail. The processor  
7. section 1104 includes a content queuing processor 1102 that selects and moves content  
8. to appropriate queues in the queue section 1110. In the example shown, there are four  
9. queues, one for each of four types of content:

10.                   true on-demand first sections queue 1111,  
11.                   popular content first sections queue 1112,  
12.                   true on-demand second sections queue 1113, and  
13.                   popular content second sections queue 1114.

14. The queues 1111 - 1114 are serviced (i.e., selected for broadcast) by the priority  
15. queue server 1115 on a priority basis, where the true on-demand first sections queue 1111  
16. has the highest priority and the three other queues 1112 - 1114 have lower priority. In  
17. an implementation, the highest priority queue (i.e., the queue 1111) will always be  
18. serviced first if there are any elements in the queue 1111 (i.e., priority  $P = 1$ ). Also, in  
19. an implementation, the three remaining queues 1112, 1113 and 1114 are serviced in a  
20. round-robin fashion with equal priority  $P = 2$  among the three queues 1112 - 1114. In  
21. other implementations, more complex queue servicing algorithms may be employed. For  
22. example, the length of each queue may be taken into account in determining priority  
23. rather than just the priority of the queue. Similarly, one implementation may combine  
24. the three lower-priority queues into a single queue, and the ordering of this single queue  
25. would be provided by the content queuing processor 1102 instead of the priority queue  
26. server 1115. A time element may be incorporated into the queue servicing algorithm  
27. such that a queue will be serviced if a content item has been stored in that queue for a  
28. specified maximum time. The specified maximum queue time may be chosen so that

1 service time guarantees are met. In other words, if the system 1100 guarantees a content  
2 delivery time for certain content, then the appropriate queue may be service out of order  
3 so that the guaranteed content delivery time is met. Several other variations can be used  
4 to optimize the balance of performance of the system. For example, as noted above,  
5 additional server capacity from non-related activities may be used to bolster delivery  
6 capacity during peak demand periods.

7 Available storage in the viewer 266 and the library 262 will constantly be updated  
8 with the first sections of popular content titles and/or those content titles that are being  
9 specifically promoted by content suppliers and/or service providers. The goal is to ensure  
10 that any "empty" storage in the viewer 266 or the library 262 is filled with the first  
11 sections of content that is likely to be viewed by subscribers. More advanced approaches  
12 to filling this content and selecting the appropriate first sections can include algorithms  
13 based on "books viewed" data and content suggestion based on books viewed, geo-  
14 demographic data related to subscribers, and other schemes detailed in the related  
15 targeted advertising and content suggestion disclosures.

16 This invention can be applied to the virtual on-demand nature of any content form  
17 and any distribution medium. For example, the same invention applies to books, text,  
18 images, television, motion picture, multimedia and interactive content. It applies  
19 anywhere a balance of on-demand performance and infrastructure efficiency is desired.

20 In a broadcast model, electronic books, or electronic book first sections, may be  
21 queued in the queue 1112 for broadcast delivery to subscribers. For example, the first  
22 sections of the top ten New York Times best sellers are placed in the queue 1112 and are  
23 subsequently broadcast to all of the subscribers of the system 1100. Alternatively, the  
24 first sections are broadcast to a selected group of the subscribers of the system 1100. The  
25 selected group of subscribers may be determined by reference to gathered books read  
26 data, demographic data or subscribers preferences, for example.

27 The VBOD delivery system 1100 allows for electronic books to be broadcast to  
28 subscribers based on the use of subscriber data, electronic books data, and subscriber-

1 entered data, such as mood indicators entered by the subscribers and used in an electronic  
2 book suggestion algorithm. Alternatively, input from subscribers collected through form-  
3 based questionnaires may be used to further define a subscriber's preferences. The system  
4 1100 may optimize the electronic book delivery process by ensuring that specific  
5 electronic books are provided to the desired subscribers. One method uses electronic  
6 book targeting. For example, first sections of electronic books may be broadcast to a  
7 group of subscribers based on subscriber profile data. Specifically, electronic books,  
8 electronic magazines and periodicals, and electronic newspapers, or first sections of the  
9 same, can be sent to those subscribers most likely to buy the electronic content.

10 Electronic books and other electronic media can be broadcast in a variety of  
11 formats. First, a cyclical broadcast of the first sections may be accompanied by menu  
12 data that is used to generate a VBOD menu, based on templates residing on the library  
13 262 on the viewer 266. Referring to Figure 14k, a menu 879 may be in the form of a full  
14 screen textual, textual with audio background, graphical, graphical with audio  
15 background, or video image. To view, or read, a broadcast first section of an electronic  
16 book, the subscriber uses a remote control or other control feature to highlight a desired  
17 selection, and then operates a select button. Upon operation of the select button, a first  
18 page of the selected first section is displayed on the viewer 266. Subsequent pages are  
19 displayed when the next page button 742, for example, is used.

20 To order a second section of an electronic book, the subscriber returns to the main  
21 menu screen 879 and indicates a purchase option by selecting an appropriate box next to  
22 the desired selection. The electronic book order is then relayed to the system 1100 (see  
23 Figure 24b), and the second section is processed for delivery to the subscriber.  
24 Alternatively, if the first section is read or is open for a specified time, or if a specified  
25 page or an electronic link in the first section is displayed, a request for a corresponding  
26 section or remaining section of the electronic book may be generated in the viewer 266.  
27 The request is then transmitted to the system 1100 automatically and immediately or may  
28 be transmitted the next time the viewer 266 is coupled to the system 1100. An order for

1 a section may be indicated to the subscriber using a notice menu that informs the  
2 subscriber that an order has been placed. Alternatively, a confirmation menu may be used  
3 to prevent automatic ordering and to allow the subscriber to initiate the order. Finally,  
4 a book delivered menu may be displayed on the viewer 266 to indicate delivery of the  
5 second section. The book delivered menu may persist until acknowledged by the  
6 subscriber.

7 In a second format, the system 1100 may broadcast entire electronic books to  
8 subscribers. In this alternative arrangement, the entire electronic book could include a  
9 first section that could be viewed by the subscriber at no cost. A second section would  
10 then be available for viewing provided the subscriber executed an appropriate purchase  
11 option. For example, the subscriber could order one of the broadcasted electronic books.  
12 The system 1100 would then return a code or encryption key that would allow the  
13 subscriber to access the second portion of the electronic book. Such a code could be  
14 broadcast, or sent directly to the subscriber over a telephone network or cable television  
15 network, for example. Methods and systems for providing such a code are described in  
16 detail in copending U.S. Application Serial No. 09/289,952, filed April 13, 1999, entitled  
17 ELECTRONIC BOOK ALTERNATIVE DELIVERY SYSTEMS, the disclosure of  
18 which are incorporated by reference.

19 Regardless of which format is used, after a specified or preset time, for example  
20 ten days, the first sections and the second sections that are stored in the home system 258,  
21 and that are not subsequently purchased by the subscriber, may be deleted from memory,  
22 thereby freeing storage space in the home system 258 for additional electronic book  
23 broadcasts. Alternatively, the first sections may be overwritten by more recently  
24 delivered first sections.

25 The second section queues 1113 and 1114 may contain only the second sections  
26 corresponding to the first sections in the first section queues 1111 and 1112, respectively.  
27 Alternatively, the second section queues 1113 and 1114 may contain the entire electronic  
28 book. In this embodiment, the content delivered from the second section queues 1113

1 or 1114 may overwrite the corresponding first sections stored in a viewer 266, for  
2 example.

3 The first sections described above may be a first portion of an electronic book,  
4 such as an introduction, table of contents (if provided), and a first chapter, for example.  
5 The first portion could also include critical reviews, book summaries, and other  
6 descriptive material including graphical display, JPEG images and MPEG 2 videos, for  
7 example. The first portions may include suggestions for additional reading and may  
8 include targeted advertisements. The targeted advertisements may include descriptions  
9 of additional available electronic books. Alternatively, the targeted advertisements may  
10 include advertisements that are unrelated to the electronic books, but which market  
11 surveys or other similar information indicate might appeal to specific subscribers or to  
12 specific subscriber groups. Finally, the first sections may contain electronic links to  
13 related content or to corresponding second or remaining sections of electronic books as  
14 described in Section VIII below.

15 Figure 25 is a flowchart illustrating some of the processing routines that may be  
16 used with the electronic book delivery system 1100 of Figure 2b. The flowchart  
17 illustrates operation of the system 1100 having the queues 1111 - 1114, with the queue  
18 1111 serviced first and the queues 1112 - 1114 serviced on a round robin basis. The  
19 processing routines consist of software modules, firmware and hardware operating on,  
20 or in conjunction with the processors 1104 of the electronic book delivery system 1100,  
21 and the processor 621 of the viewer 266, for example. The process begins with broadcast  
22 module 1210 operating on the processors 1104. Content, in the form of one or more  
23 electronic books, is broadcast to specific subscribers of the system 1100. The electronic  
24 books could be electronic counterparts of books, magazines, newspapers, or any other  
25 printed medium. The content may include text, graphics, images, both JPEG and MPEG  
26 2, data, graphs, and any other information that could be presented in an interactive  
27 viewing medium. The content may also include audio files, including a complete audio  
28 version of a book, for example. Different subscribers may receive different electronic

books. For example, a first subscriber may receive an electronic version of the New York Times every day, while a second subscriber may receive popular fiction books on a periodic basis, such as monthly. The broadcast may also include any encryption/decryption devices needed to protect the electronic books while letting authorized subscribers access the electronic books. In an example, a selection of new mystery books is shipped, or transmitted, to the second subscriber every month and a selection of new history books is transmitted to a third subscriber every month. The second and third subscribers then store the transmitted electronic books in the home system 258 until the first and the second subscribers desire to access one or more of the electronic books. After a specified time without initial access, the electronic books may be automatically deleted from memory or may be overwritten.

In an alternative arrangement, to provide a near on-demand electronic book service, the system 1100 could broadcast only first sections of the mystery books and first sections of the history books to the second and the third subscribers, respectively.

In book order module 1220, the system 1100 has received an electronic book order from a subscriber or a link from the subscriber corresponding to an order. The order may be for a complete electronic book, or may be for a second section of a book already sent to a subscriber. The electronic book order will include an identity of the subscriber requesting the second section or the complete electronic book. The processor 1102 then uses order analysis module 1230 to determine the type and identity of the ordered electronic book. For example, the processor 1102 determines if the electronic book is for a second section of a book already transmitted to the subscriber. The type and identity of the ordered electronic book determine in which queue of the system 1100 the electronic book is to be placed. For example, if the electronic book order is for a second section of a popular book, the processor 1102 determines to place the second section in the popular content second sections queue 1114. In response to the electronic book order, the processor 1102, executing packet assembly module 1240 will assemble a data packet including the electronic book content, targeted advertisements and header information

1 that may include the electronic address of the subscriber who originated the electronic  
2 book order and appropriate decryption and access codes, for example. The processor  
3 1102 will then execute a routine using a queue selection module 1250 that causes the data  
4 packet to be placed in the appropriate queue. In the example described above, the data  
5 packet is placed in the popular content second sections queue 1114.

6 In queue servicing module 1260, the priority queue server 1115 determines if any  
7 of the queues 1111 - 1114 is currently storing any content for delivery. If the queue 1111  
8 includes at least one electronic book, the server 1115 will service the queue 1111 to send  
9 the corresponding data packet to the appropriate subscriber. If any of the queues 1112  
10 -1114 include at least one electronic book, the server 1115 will next service that queue.  
11 The servicing will be in a round robin fashion. For example, if the queue 1111 includes  
12 one electronic book and the queues 1112 - 1114 each include two electronic books, the  
13 server 1115 will first send the electronic book in the queue 1111 to the subscriber who  
14 ordered it. The server 1115 will then send an electronic book from the queues 1112, the  
15 queue 1113 and the queue 1114, in that order, for example, before starting over with the  
16 queue 1112. When all the queues are empty, and no other electronic book orders are in  
17 the system 1100, the processor 1102 ends the processing functions associated with near  
18 on-demand electronic book order and delivery.

19 The queue servicing module 1260 may include a timing module 1265. The timing  
20 module 1265 may monitor a length of a queue, or alternatively, an amount of time a  
21 packet resides in the queue. In either event, the timing module 1265 may be used to  
22 signify that a data packet has resided in the queue longer than a desired time, that may be  
23 linked to a service guarantee. In this case, the data packet may be delivered out of the  
24 normal sequence. That is, the priority model may include an override function that  
25 advances the delivery of a particular data packet in order to meet service guarantees.

26 The priority queue server 1115 or another processor (not shown in Figure 24b)  
27 in the system 1100 may monitor multiple requests for a same electronic book or for a  
28 same second or remaining section of an electronic book. The processor may then

1 determine if any orders are for the same electronic book or the same second section,  
2 process all such orders at one time and, using broadcast distribution and addressing, the  
3 system 1100 could deliver the electronic books or the second sections to the multiple  
4 requesting subscribers.

5 **VIII. Electronic Book Link System**

6 Electronic book links allow the subscriber to use the electronic book viewer 266  
7 to traverse pre-defined paths between content in their currently viewed electronic book  
8 to related information contained either elsewhere in the electronic book, elsewhere on the  
9 viewer 266, or external to the viewer 266, including in the library 262 or in a connected  
10 Internet web site. These links provide an organized and methodical method for the  
11 subscriber to quickly access related topic areas or seek clarification of the currently  
12 viewed material.

13 An electronic book includes first locations, or components, such as words,  
14 phrases, sentences, sections of text, paragraphs, pages, chapters, figures, drawings, maps,  
15 video clips, and audio clips. Links to second and subsequent locations, or components,  
16 contained in the same electronic document or in another related electronic document, file,  
17 or database can be associated with each of these first components. First components with  
18 underlying links can be highlighted and displayed on the viewer display 602 or on the  
19 connected television 259 or a personal computer 261 (see Figure 2). First components  
20 that have underlying links associated with them may be identified by assigning them a  
21 unique identifier. The unique identifier can be a word or phrase, an alpha-numeric value,  
22 a coordinate point, or other unique identifier. In an embodiment, each such first location  
23 may be assigned an identifying index value.

24 Second components can include second sections, main sections, or remaining  
25 portions of electronic books that correspond to first sections or auxiliary sections  
26 delivered by a virtual book-on-demand system such as the system 1100 shown in Figure

1       24b. A link in the first section of the electronic book links to the second component, or  
2       second section of the electronic book. Accessing the link may cause an electronic book  
3       order to be placed with the system 1100 and the content to be delivered automatically or  
4       upon request.

5       The use of the index value allows the first components to maintain links with  
6       other components, even if the electronic book is altered. For example, a subscriber may  
7       use a cut and paste edit feature to move a block of text containing a first component.  
8       Cutting and pasting will not affect the status of the first component and its links to other  
9       components. Similarly, changing font style or font size will not affect the status of the  
10      links.

11      In the creation of an electronic book, or subsequently, the electronic book may  
12      undergo a process that maps identifying index values to each of the first components.  
13      These index values can then be accessed by software directives that drive the presentation  
14      of alternative or linked material (e.g., material at one of the second locations) once a  
15      selection is made. For each electronic book, these index values may be contained in a  
16      hidden table that maps the identifying index values of all first components with  
17      underlying links to the location of the linked material (the second location). Moreover,  
18      each such first component may be linked to one or many linked material locations. That  
19      is, the first component may be linked to a second component, a third component and so  
20      on. An example of a hidden table is presented below.

21      As shown in the table, a first location "Cezzanne" has an identifying index value  
22      135. "Cezzanne" has three links. A link to a first location is to an art encyclopedia. A  
23      link to a second location is to an electronic dictionary that provides a pronunciation  
24      guide. A link to a third location is to an audio file that plays a short biography of the  
25      artist. Each of the first, second and third locations have their own index values.

Identifying Index Value(s)	Component Identifier	Link Number	Linked Material Identifier	Linked Material Description	Linked Material Location (file location / file name / corresponding index value)
135	"Cezzanne"	1	More on Cezzanne	Reference material on Cezzanne	Art- Encyclopedia.com/FrenchArtists/Index Value = 1
135	"Cezzanne"	2	Pronunciation	Pronunciation of the word	Websters.com/ Websters E-Dictionary/Index Value = 56221
135	"Cezzanne"	3	Audio Clip	Audio file providing condensed Cezzanne's biography	Viewer/ Current file/Index Value = 199384
133-135	"PorchScene by Cezzanne"	1	Graphic File	JPEG file presenting Cezzanne's PorchScene painting	Viewer/ Current file/Index Value = 9382
5673	"reactivism"	1	Definition	Definition of the word	Websters.com/ Websters E-Dictionary/Index Value = 564
4948-4950	"Order <u>Little Women</u> " menu item	1	Book Order	Order the book <u>Little Women</u>	Discovery.com/ Little Women Order/Index Value = 672
4949-4950	" <u>Little Women</u> "	1	Book review	Review of the book "Little Women"	LiteraryWorks.com/ Little Women/Index Value = 1
90462	"Dental diseases"	1	TOC link to Document Body	Link from Table of Contents to desired chapter	Viewer/ Current file/Index Value = 69980
1342	"Dental diseases"	2	Related discussion group	Access to Web discussion group on gum diseases	NoMoreCavities.com/ Index Value = 1
572	"VegieMaster"	1	Product Order	Order the product "VegieMaster"	HomePurchases.com/ KitchenProducts / Index Value = 1
14	"Chesapeake"	1	Video	Video clip of interview with J. Michener on writing of Chesapeake	Viewer/ Current file/Index Value = 38677
14	"Chesapeake"	2	Narration	Audio file – narration of Chesapeake by J. Michener	Viewer/ Current file/Index Value = 38678

Linked material location information (i.e., the location of second and subsequent components) can include source location, book name, chapter, page, line, and word as identified by their index value. The source location will provide the delivery system 200

1 the necessary information to contact the operations center 250, the Internet web site 279  
2 (see Figure 2) or another electronic database and request the appropriate material for  
3 retrieval and download if it currently does not reside on the viewer 266 or the home  
4 system 258. In the case that the linked material resides on the Internet web site 279 or  
5 on another electronic database, the location information in the hidden table allows the  
6 operations center 250 or home system 258 to retrieve the desired material from the  
7 Internet web site 279 or from the electronic database. Linking of a first section of an  
8 electronic book to a corresponding second or remaining section of the electronic book  
9 may initiate an electronic book order.

10 If the second component, or linked material, is located at the viewer 266, the  
11 processor in the viewer 266 can cause the linked material to be displayed without any  
12 communications with an outside source. For example, if the first component is the name  
13 "Cezanne" and the linked material, or second location, is in an electronic dictionary  
14 stored in the viewer 266, the viewer 266 can display the electronic dictionary entry for  
15 "Cezanne." This linked material may be displayed full screen, in a picture-in-picture  
16 window, or as an overlay, for example. The entry can also remain hidden, until a  
17 subscriber of the viewer 266 commands the entry to be displayed.

18 Upon selection of a component with underlying links, the software directive  
19 determines the identifying index values associated with the selected component, searches  
20 the table for the index values of the selection made, looks up the corresponding linked  
21 location, accesses the location, and displays the linked material on the viewer 266. The  
22 linked material can be displayed on the viewer 266 in place of the original source  
23 material, or simultaneously with the original source material by displaying the linked  
24 material in a picture-in-picture window, via a split screen, or via a screen overlay.

25 Figure 26 shows a portion of a page of electronic text having one or more  
26 electronic links. The display 602 may include a show links button 606 and a help button  
27 612. The show links button 606 may be used to display a link menu 971 (see Figure 13  
28 and Figure 27). That is, the viewer 266 can be commanded, via the show links button

1 606, to display all components that have underlying links. The components may be  
2 displayed in a highlighted mode, in a different color, in a unique font, bold or italic  
3 typeface, underlined, outlined, or in reverse background mode, for example. To make a  
4 selection of a component to view the underlying linked material, the cursor 745 is used  
5 to identify the desired selected item. The ball 743 is used to guide the cursor 745 across  
6 the page to the desired selected item, and the selection button is used to make the  
7 selection. Alternatively, cursor movement for screen navigation can be provided via  
8 devices such as a fingerpad, mouse, or joystick. Selection can also be made by  
9 incorporating a touch-sensitive screen into the viewer 266.

10 Figure 26 depicts the display before commanding the viewer 266 to show links.  
11 Figure 27 shows the display once the request has been made to display all underlying  
12 links. Figure 27 shows the link menu 971, a help button 612, and a multi-function  
13 button, or pull-down menu, 614. The multi-function button 614 can be used as a return  
14 button, a hide active links button, and a restore active links button, for example.  
15 Alternately, several additional buttons may be provided to select these features. The  
16 multi-function button 614 may be active when the show links button 606 has been  
17 operated. In Figure 27, the components having underlying links are "PorchScene by  
18 Cezzanne" and "Cezzanne." The component "PorchScene by Cezzanne" is shown with  
19 one link and the component "Cezzanne" is shown with three links. Also shown in Figure  
20 27 is the link menu 971 that lists the links, or components, the link number and a  
21 description of the linked material. For example, the material linked to the component  
22 "PorchScene by Cezzanne" is a JPEG video file showing the painting.

23 Once a link is selected, an on-screen return button 614 allows the subscriber to  
24 return from the linked material back to the originally viewed text. The show links button  
25 606 (see Figure 26) can be displayed on the viewer 266 either at all times that an  
26 electronic book is open, any time an underlying link exists, or only when commanded to  
27 do so from the viewer's menu system 851.

1        When linked material is displayed (for example, in an overlay fashion) the  
2 subscriber can command the linked material to be placed in a hidden state by operating  
3 the hide active link button 614 or by use of the menu system 851. When an active link  
4 is hidden, the restore active link button 614 is displayed. Operation of the restore active  
5 link button 614 will display the material linked by the active link.

6        Alternatively, the on screen "Help" menu 887 (see Figure 13) provides access to  
7 further assistance when selecting links. The Help menu 887 is accessed by operation of  
8 the on-screen help button 612. Related link options will be available for display on the  
9 viewer 266 by selecting the Help menu 887, using the cursor 745 to do so. The "Help"  
10 function allows the subscriber to select which specific links to be displayed on-screen.  
11 The links when displayed may be simply highlighted portions of text, or text in different  
12 colors. All links for the displayed page can be selected to be displayed. Alternatively,  
13 by selecting a range of content in an electronic book that may have multiple underlying  
14 links, only links associated with the components within the selected range will be  
15 presented on the viewer 266 for the subscriber to select the specific link desired.  
16 Alternatively, a fixed number of links may be selected to be displayed on the screen at  
17 a time. Alternatively, only a certain type of link may be selected to be displayed. The  
18 types of links that are available for display may be listed in a pop-up menu. The  
19 subscriber can choose from this pop-up menu which of the links to display. For example,  
20 the pop-up menu could list links for a dictionary and links to an Internet web site. The  
21 subscriber could choose to display only the dictionary links. Figure 28 depicts the menu  
22 screen 981 used to manage the subscriber's filtering of links to view.

23        Figure 28 is a logical representation of the components and links for the example  
24 first component "Cezzanne" shown in Figure 26. In Figure 29, the text block (page) 602  
25 containing the first component Cezzanne 980 is shown linked to components in other  
26 electronic files or documents. A first link 981 links Cezzanne 980 to a reference material  
27 component 982, which is an encyclopedic entry related to the artist. A second link 983  
28 links Cezzanne 980 to a dictionary entry 984 that includes a pronunciation key for the

1 artist's name. A third link 985 links Cezzanne 980 to an audio clip 986, which provides  
2 an audio file describing the artist's life. If the subscriber chooses the audio clip 986, the  
3 audio file will immediately begin playing and will be broadcast on a speaker in the viewer  
4 266, or the attached television or the attached personal computer, as applicable. The  
5 subscriber can stop the playback by operating the hide active link button 614.

6 The links described above may also function in two directions. A biography of  
7 Cezzanne could include a link to the JPEG file showing PorchScene. The JPEG file  
8 PorchScene could be one of several still videos of the artist's work. This JPEG file could  
9 be linked to an appropriate section of the Cezzanne biography. Then, if the subscriber  
10 were viewing the JPEG file for PorchScene, the subscriber could display the link to the  
11 biography and, upon activating the link, have displayed that portion of the biography that  
12 discusses PorchScene. In this example, the same link is used to display either the JPEG  
13 file or text from the biography. The same hidden table can be used with the two  
14 electronic files (i.e., the biography and the JPEG file). Alternately, each electronic file  
15 may have its own hidden table. In this alternative, the same link may be referenced in  
16 each of the hidden tables.

17 In the discussion above, each first component is linked to one or more other  
18 components. However, the other components (i.e., the second and third components, for  
19 example) may also be linked together. In addition, other components linked to one first  
20 component may be crossed-linked to other components that are linked to a second first  
21 component (identifying secondary or tertiary cross-links). For example, the JPEG file of  
22 PorchScene referred to in Figure 27 may be cross-linked to the audio file-biography  
23 shown in Figure 27. Displaying the JPEG file will result in a cross-link being identified  
24 that links the JPEG file to the audio file.

25 The cross-link may be indicated by highlighting, underlining, outlining, using a  
26 bold or an italics typeface, using a different font, and using different color text. If the  
27 cross-linked material is selected, that material will then be displayed. In the example  
28 described above, the JPEG video file that shows the painting PorchScene can be cross-

1 linked with Cezanne and its identity would be displayed on the viewer 266. The video  
2 file could be displayed full screen or in a picture-in-picture format. The video file could  
3 also be displayed on the attached television 259 or the personal computer 261 (see Figure  
4 2). Finally, the video file could be printed by sending the video data and a print  
5 command to a printer 262 attached to the home unit 258 or to the personal computer 261.

6 In the table previously shown, all the links for a number of electronic books were  
7 provided in one hidden table. In an alternate arrangement, many hidden tables may be  
8 provided. For example, each electronic book may be provided with a hidden table. In  
9 this alternative, the many hidden tables could form a relational database of linked  
10 material. As an example, several different electronic medical text books could each be  
11 provided with its own hidden table. An electronic general medical encyclopedia could  
12 also be provided with a hidden table. Terms that are listed in one of the several medical  
13 electronic text books could then be linked, in a relational fashion to the electronic  
14 medical encyclopedia. The several electronic medical text books could also be  
15 relationally linked to each other, to on-line databases and to other electronic files. For  
16 example, an electronic medical text book could be electronically linked to electronic  
17 books, databases and other electronic files maintained at a medical school's library.

18 The hidden table (either for many electronic books, or individually for each  
19 electronic book) may be provided by the central provider or distributor as an additional  
20 feature that is paid for separately from purchasing an electronic book. The distributor  
21 may offer many different levels of service, such as only linking material (components)  
22 stored on a viewer, only linking material within a particular electronic book, or linking  
23 one or more electronic books to electronic files outside the home system 258 (e.g.,  
24 linking an electronic book to a database maintained by the distributor at an Internet web  
25 site).

26 Downloading the most current links table for an electronic book from the  
27 operations center 250 or the Internet web site 279 refreshes the hidden links table, that  
28 is, any new links that have been generated by the operations center 250, for example, are

1 added to the hidden links table. The current links table may be downloaded in  
2 conjunction with downloading a new electronic book. Alternately, the current links table  
3 may be provided periodically by the operations center 250.

4 Subscribers can create their own links by adding new entries to the hidden links  
5 table, using Hypertext Markup Language (HTML) or other standard programming  
6 language or by using a simple graphical subscriber interface, for example. In an  
7 embodiment, an on-screen, software-based, menu-driven facility is provided, accessible  
8 through the menu system 851 (see Figure 13), that allows the subscriber to select the  
9 desired source components to define an underlying link, to select the desired linked  
10 components and define their location, and to create the remaining table entries. Creation  
11 of table entries can be supported via either an on-screen, simulated keyboard, the attached  
12 keyboard 267, or the remote keyboard 268 (see Figure 6a). To ease creation of links,  
13 default table entry items may be offered to the subscriber by the menu system 851 where  
14 ever possible. The desired linked components can be accessed and displayed  
15 simultaneously with the desired source components via the use of a picture-in-picture  
16 window, via a split screen, or via a screen overlay. Alternatively, if the material to be  
17 linked is to be created by the subscriber, the subscriber can create a new content file on  
18 the viewer 266 and link directly to components in that newly created file. This allows the  
19 subscriber to create customized annotations and notes that are directly associated with the  
20 specific components of an electronic book. Text entry into the newly created file is  
21 handled via either the on-screen, simulated keyboard, the attached keyboard 267, or the  
22 remote keyboard 268.

23 As noted above, links within electronic books may be self-contained in nature,  
24 where all the material to be linked to is resident within the same electronic book file.  
25 Additionally, links may also be provided between material residing on the viewer 266.  
26 Also, links may be provided to material that currently resides on the home system 258,  
27 if separate from the viewer 266. Finally, links may be provided to material that must be  
28 accessed through a communications network. For example, material that is ordered or

1 must be downloaded from the operations center 250 or the Internet web site 279 may be  
2 linked to an electronic book or to a first section of the electronic book. On screen menus  
3 can also be supported on the viewer 266 in the form of electronic book files, serving as  
4 a book or product catalog or service catalog that allows the subscriber to link to the  
5 operations center 250 or the Internet web site 279 to order additional electronic books or  
6 products and services at any time by selecting the desired component from the text.

7 If the content that is to be linked to is currently not available on the electronic  
8 book viewer 266, the viewer 266 may prompt the subscriber to decide whether to: 1)  
9 retrieve the corresponding material immediately from the home system 258, the  
10 operations center 250, or the Internet web site 279; 2) wait until the next communication  
11 opportunity with the home system 258 or operations center 250 to retrieve the material;  
12 3) commence direct outside communications with another communications system (e.g.,  
13 a telephone in a PSTN); or 4) stop.

14 In one embodiment, the first components on the viewer 266 are a Table of  
15 Contents and List of Figures for a book. Making a selection from the Table of Contents  
16 and List of Figures automatically links to and displays the selected page within the  
17 electronic book file. In another embodiment, the first components on the viewer 266 may  
18 be an Index of an electronic book. Selecting the desired topic and associated page will  
19 cause that page to be displayed on the viewer 266. In yet another embodiment, the first  
20 component is a footnote or endnote. When the footnote is selected, the viewer 266  
21 provides a display of material that further addresses the reference. In another  
22 embodiment, the first component is a word or phrase that has a further definition or  
23 clarification associated with it. By selecting the first component, the corresponding  
24 dictionary definition, foreign translation, or glossary entry will be displayed on the viewer  
25 266. The dictionary definition or foreign translation may also be provided via an audio  
26 file. In this embodiment, electronic books can be bundled with other standard reference  
27 material or alternatively, stand-alone reference material like dictionaries or encyclopedias  
28 may be accessed from within multiple electronic book files.

1           In another embodiment, the first component is a reference to another electronic  
2 book altogether. By selecting the first component, the selected book is displayed on the  
3 viewer 266. In another embodiment, on-screen menu buttons will be displayed on the  
4 viewer screen 602 that allow for a quick link to the Table of Contents, Index, glossary,  
5 and other key electronic book sections by simply selecting the item on the viewer screen  
6 602 with the cursor 745. In yet another embodiment, the selected first component links  
7 the subscriber to a book review or series of book reviews, providing additional  
8 information to assist in the decision of selecting a new electronic book. In another  
9 embodiment, the selected first component is a book title, chapter title, or text in the body  
10 of a book that is linked to an audio file that serves as an audio narration of the selection  
11 that is played on the viewer 266. In yet another embodiment, the selected first component  
12 links to a video file (JPEG or MPEG) that can be displayed on the viewer screen 602.  
13 Another embodiment is a first component that links to textual annotations and notes that  
14 have been created by the subscriber.

15           One embodiment includes first or subsequent components that are electronic book  
16 titles that, when selected, links the subscriber to the operations center 250 or the Internet  
17 web site 279 to allow for the ordering of the selected electronic book or sections of the  
18 electronic book. In a similar embodiment, the selected component consists of a product  
19 that, when selected, link the subscriber to the operations center 250 site or an Internet  
20 web site to allow for the ordering of the selected product. Lastly, in another embodiment,  
21 the selected component is a topic on which there is a link to an Internet-based discussion  
22 group that addresses the topic in more detail.

23           When a link is provided to link a word or phrase to a foreign language dictionary,  
24 the viewer 266 may display a foreign language selection feature. The subscriber may  
25 then indicate which language to use when activating the link. For example, an English  
26 word or phrase in the electronic book may be linked to a French, Spanish or German  
27 dictionary. The subscriber may specify which of these foreign language dictionaries to  
28 link to.

1        While this invention has been described in conjunction with the specific  
2 embodiment outlined above, it is evident that many alterations, modifications and  
3 variations will be apparent to those skilled in the art. Accordingly, the preferred  
4 embodiments of the invention as set forth above are intended to be illustrative, not  
5 limiting. Various changes may be made without departing from the spirit and scope of  
6 the invention as defined in the following claims.

1 In the Claims:

- 2 1. A virtual on-demand electronic book system, comprising:
  - 3 a main memory that stores electronic books for delivery to subscribers in the
  - 4 system;
  - 5 a queuing processor coupled to the main memory that receives electronic book
  - 6 orders and determines a queue location for an ordered electronic book;
  - 7 first queues that temporarily store first sections of electronic books; and
  - 8 second queues that temporarily store second sections of electronic books.
- 9 2. The system of claim 1, wherein the first queues, comprise:
  - 10 an on-demand first section queue; and
  - 11 a popular content first section queue, and wherein the second queues, comprise:
    - 12 an on-demand second sections queue; and
    - 13 a popular content second sections queue.
- 14 3. The system of claim 1, further comprising a priority queue server coupled to the
- 15 first and the second queues, wherein the server empties the first and the second queues
- 16 based on a priority model.
- 17 4. The system of claim 3, wherein the priority model, comprises:
  - 18 emptying the on-demand first section queue; and
  - 19 emptying the popular content first section queue, the on-demand second sections
  - 20 queue and the popular content second sections queue in a round robin manner.
- 21 5. The system of claim 4, wherein the priority model includes a timing module,
- 22 wherein the timing module determines a time an electronic book is stored in the first and

1 the second queues and wherein when a maximum time is exceeded, the server transmits  
2 the electronic book out of order.

3 6. The system of claim 3, wherein the priority model comprises:  
4 determining a length of each queue; and  
5 transmitting an electronic book from a queue having a longest length.

6 7. The system of claim 3, wherein the priority model comprises:  
7 searching queues for similar electronic book orders; and  
8 broadcasting completed electronic book orders simultaneously.

9 8. The system of claim 3, further comprising:  
10 an Internet web site;  
11 a web server coupled to the Internet web site;  
12 a delivery server coupled to the web server; and  
13 a transaction server coupled to the web server, wherein the queuing processor  
14 receives electronic book orders from the transaction server and the delivery server  
15 receives ordered electronic books from the queue priority server.

16 9. The system of claim 1, further comprising:  
17 a service time guarantee; and  
18 a network coupling the processor to an associated data processing system, wherein  
19 the processor determines a pending service time, wherein if the pending service time  
20 exceeds the guarantee, the processor establishes a connection with the associated data  
21 processing system, and wherein the associated data processing system processes  
22 electronic book orders.

- 1 10. The system of claim 1, further comprising:
  - 2 an electronic book viewer, the viewer, comprising:
    - 3 a receiver that receives electronic books,
    - 4 a transmitter that transmits electronic book orders, and
    - 5 a memory coupled to the receiver that stores the electronic books; and
    - 6 a processor coupled to the receiver and the memory that controls processing on
    - 7 the viewer, wherein the receiver receives broadcasts of first sections of electronic books
    - 8 and stores the first sections in the memory.
- 9 11. The system of claim 10, wherein when a first section stored in the memory is
- 10 accessed, the processor generates an order for a corresponding second section, and the
- 11 transmitter transmits the order.
- 12 12. The system of claim 10, wherein a first section of the electronic book includes a
- 13 link, wherein when the link is accessed, the processor generates an order for a
- 14 corresponding second section of the electronic book.
- 15 13. The system of claim 1, wherein the electronic books comprise an electronic
- 16 version of one or more of a printed book, a magazine, a catalog, a periodical and a
- 17 newspaper.
- 18 14. The system of claim 1, wherein specified electronic books are broadcast on a
- 19 cyclical basis. 
- 20 15. The system of claim 1, wherein first sections of specified electronic books are
- 21 broadcast on a cyclical basis. 

- 1        16. The system of claim 15, wherein the first sections to be broadcast are determined
- 2        by reference to one of electronic books read data, demographic data, and subscriber
- 3        preferences.
- 4        17. The system of claim 1, further comprising a virtual on-demand menu, the menu
- 5        broadcast with a broadcast of one of an electronic book and a first section of an electronic
- 6        book, wherein the menu lists electronic books available on the system.
- 7        18. A computer system for distributing electronic books, comprising:  
8            a memory that stores the electronic books;  
9            a processor section that processes electronic book orders and that packages  
10          electronic books for delivery;  
11          a queue section that stores the packaged electronic books; and  
12          a queue server that empties the queue section based on a queue priority model.
- 13        19. The system of claim 18, wherein the queue section comprises:  
14            a first queue section; and  
15            a second queue section, wherein the first queue section stores a first section of an  
16          electronic book and the second queue section stores a second section of the electronic  
17          book.
- 18        20. The system of claim 19, wherein the first queue section comprises an on-demand  
19          first section queue.
- 20        21. The system of claim 20, wherein the first queue section further comprises a  
21          popular content first section queue.

1 22. The system of claim 19, wherein the second queue section comprises:  
2 an on-demand second section queue; and  
3 a popular content second section queue.

4 23. The system of claim 18, wherein the priority model comprises a queue servicing  
5 module, the queue servicing module receiving information regarding electronic books  
6 stored in the queue section, and determining an order of delivery of the electronic books  
7 based on a location an electronic book in the queue section.

8 24. The system of claim 23, wherein electronic books in an on-demand queue are  
9 delivered before delivery of electronic books in a cyclical queue.

10 25. The system of claim 18, wherein the processor section determines when multiple  
11 electronic book orders are for a same electronic book, the processor section aggregating  
12 the multiple electronic book orders, and wherein the system simultaneously broadcasts  
13 multiple copies of the same electronic book.

14 26. The system of claim 18, wherein first sections of selected electronic books are  
15 broadcast to subscribers of the system.

16 27. The system of claim 25, wherein a second section queue includes second sections  
17 of the selected electronic books.

18 28. The system of claim 27, wherein the second sections are delivered when ordered  
19 by the subscribers.

20 29. A computer system for distributing electronic books to subscribers using a  
21 telecommunications network, comprising:

1           a broadcast module that determines a selection of electronic books for broadcast  
2 to the subscribers;

3           an electronic book order module that receives and processes orders from  
4 subscribers for electronic books;

5           a packet assembly module that assembles a packet comprising an ordered  
6 electronic book and a header section, the header section including an address of a  
7 subscriber that ordered the electronic book;

8           queue selection module that determines a queue for storing the packet; and

9           a queue service module that determines a priority for delivery of the packet from  
10 the queue.

11       30.   The system of claim 29, wherein the queue includes a first queue and one or more  
12 second queues, and wherein the queue service module determines a higher priority for  
13 delivery for any packet in the first queue than for any packet in the one or more second  
14 queues.

15       31.   The system of claim 30, wherein a priority of each one of the one or more second  
16 queues is equal.

17       32.   The system of claim 30, wherein a priority of an individual second queue of the  
18 one or more second queues is determined based on a length of the individual second  
19 queue.

20       33.   The system of claim 30, wherein the first priority queue is an on-demand queue.

21       34.   The system of claim 30, wherein one of the second queues is a popular content  
22 first section queue, wherein first sections of popular electronic books are stored, and  
23 wherein the first sections are broadcast to selected subscribers.

1       35. The system of claim 30, wherein one of the second queues is a popular content  
2       second section queue, wherein second sections of the popular electronic books are stored,  
3       and wherein the second sections are delivered when ordered by a subscriber.

4       36. The system of claim 29, further comprising an Internet web site, the Internet web  
5       site including one or more web servers, wherein the subscribers access the system by  
6       accessing a web server.

7       37. The system of claim 29, wherein the electronic book order module determines that  
8       multiple electronic book orders are for a same electronic book, and wherein the broadcast  
9       module initiates a simultaneous broadcast of the same electronic book to multiple  
10      subscribers.

11      38. An apparatus for providing electronic books, comprising:  
12            a main memory that stores main sections of the electronic books;  
13            a main interface that receives a request for a main section of an electronic book;  
14            and  
15            a main processor that locates the requested main section, wherein the main  
16            interface provides the located main section.

17      39. The apparatus of claim 38, further comprising:  
18            an auxiliary memory that stores auxiliary sections of the electronic books; and  
19            an auxiliary interface that provides auxiliary sections of the electronic books.

20      40. The apparatus of claim 39, wherein the main memory and the auxiliary memory  
21            are co-located.

1 41. The apparatus of claim 39, wherein the main interface and the auxiliary interface  
2 are co-located.

3 42. The apparatus of claim 39, wherein the main memory and the main interface  
4 comprise a kiosk.

5 43. The apparatus of claim 42, wherein the kiosk is located in one of a bookstore and  
6 a newsstand.

7 44. The apparatus of claim 39, wherein the auxiliary interface broadcasts auxiliary  
8 sections of selected electronic books.

9 45. The apparatus of claim 44, wherein the auxiliary sections are broadcast over one  
10 of a wired telephone network, a wireless telephone network, a satellite television  
11 network, a cable television network, a broadcast television network, a local area network,  
12 and a radio network.

13 46. The apparatus of claim 39, wherein the auxiliary interface provides the auxiliary  
14 sections on demand.

15 47. The apparatus of claim 39, wherein the auxiliary interface provides an auxiliary  
16 section before the main interface provides a corresponding main section.

17 48. The apparatus of claim 47, wherein the auxiliary section and the main section are  
18 linked.

19 49. The apparatus of claim 47, wherein the main section overwrites the auxiliary  
20 section.

1       50. The apparatus of claim 38, wherein a main section includes an entire electronic  
2       book.

3       51. A computer-readable medium containing instructions for controlling an electronic  
4       book delivery system, comprising:

5               a storage module that directs storage of electronic books in a main memory;

6               a broadcast module that determines a selection of the electronic books for  
7       broadcast to readers; and

8               an electronic book order module that receives and processes orders from the  
9       readers, wherein the orders received from the readers are based on the selection broadcast  
10      to the readers.

11       52. The computer-readable medium of claim 51, wherein the selection includes all  
12      electronic books stored in the main memory.

13       53. The computer-readable medium of claim 51, wherein the selection includes a  
14      subset of all electronic books stored in the main memory.

15       54. The computer-readable medium of claim 53, further comprising an authorization  
16      module that provides an authorization signal in response to an electronic book order  
17      request, the authorization signal providing access to one or more electronic books.

18       55. The computer-readable medium of claim 51, wherein the selection includes first  
19      sections of all electronic books in the main memory.

20       56. The computer-readable medium of claim 55, further comprising an authorization  
21      module that provides access to second sections of specific electronic books, wherein a

1       first section and a second section comprise the electronic book, and wherein the broadcast  
2       module provides second sections corresponding to electronic books ordered by the reader.

3       57.      The computer-readable medium of claim 55, wherein the first sections are stored  
4       in a first section queue and the second sections are stored in a second section queue.

5       58.      The computer-readable medium of claim 57, further comprising:  
6                a queue selection module that determines a queue for storing the first and the  
7                second sections; and  
8                a queue service module that determines a priority for delivery of the first and the  
9                second sections.

10      59.      The computer-readable medium of claim 51, wherein the selection includes first  
11        sections of a subset of electronic books in the main memory.

12      60.      The computer-readable medium of claim 51, wherein the broadcast module,  
13        comprises:  
14                a reader data module that receives, processes and stores reader-specific data; and  
15                an output module that prepares a reader profile, wherein the broadcast modules  
16        determines the selection based on the reader profile.

17      61.      The computer-readable medium of claim 60, wherein the reader profile is an  
18        individual reader profile.

19      62.      The computer-readable medium of claim 60, wherein the reader profile is a group  
20        reader profile.

1       63. The computer readable medium of claim 60, wherein the reader-specific data  
2 includes one or more of books read data, television programs watched data, demographic  
3 data and reader-provided data.

4

5       64. The computer-readable medium of claim 51, wherein the selection comprises a  
6 menu of available electronic books.

7

8       65. A computer-readable data transmission medium having a data structure,  
comprising:

9               a storage module that directs storage of electronic books in a main memory;

10              a broadcast module that determines a selection of the electronic books for  
11 broadcast to readers; and

12              an electronic book order module that receives and processes orders from the  
13 readers, wherein the orders received from the readers are based on the selection broadcast  
14 to the readers.

15

16       66. The computer-readable medium of claim 65, wherein the selection includes all  
electronic books stored in the main memory.

17

18       67. The computer-readable medium of claim 65, wherein the selection includes a  
subset of all electronic books stored in the main memory.

19

20       68. The computer-readable medium of claim 67, further comprising an authorization  
21 module that provides an authorization signal in response to an electronic book order  
request, the authorization signal providing access to one or more electronic books.

22

23       69. The computer-readable medium of claim 65, wherein the selection includes first  
sections of all electronic books in the main memory.

1       70. The computer-readable medium of claim 69, further comprising an authorization  
2 module that provides access to second sections of specific electronic books, wherein a  
3 first section and a second section comprise the electronic book, and wherein the broadcast  
4 module provides second sections corresponding to electronic books ordered by the reader.

5       71. The computer-readable medium of claim 70, wherein the first sections are stored  
6 in a first section queue and the second sections are stored in a second section queue.

7       72. The computer-readable medium of claim 71, further comprising:  
8               a queue selection module that determines a queue for storing the first and the  
9               second sections; and  
10              a queue service module that determines a priority for delivery of the first and the  
11               second sections.

12       73. The computer-readable medium of claim 65, wherein the selection includes first  
13               sections of a subset of electronic book in the main memory.

14       74. The computer-readable medium of claim 65, wherein the broadcast module,  
15               comprises:  
16               a reader data module that receives, processes and stores reader-specific data; and  
17               an output module that prepares a reader profile, wherein the broadcast modules  
18               determines the selection based on the reader profile.

19       75. The computer-readable medium of claim 74, wherein the reader profile is an  
20               individual reader profile.

1       76. The computer-readable medium of claim 74, wherein the reader profile is a group  
2 reader profile.

3       77. The computer readable medium of ~~claim~~ 74, wherein the reader-specific data  
4 includes one or more of books read data, television programs watched data, demographic  
5 data and reader-provided data.

6  
7       78. The computer-readable medium of claim 65, wherein the selection comprises a  
8 menu of available electronic books.

9       79. A user interface for ordering and receiving electronic books, comprising:  
10            a display window that displays an indication of available electronic books,  
11            wherein the indication is a menu of available electronic books, and wherein the display  
12            provides for selection of a first section of an available electronic book;  
13            a cost window that displays a cost of the available electronic books;  
14            a delivery selection section that provides for specifying a delivery medium; and  
15            an order button that sends an order for a second section of an electronic book  
16            corresponding to a selected first section of an electronic book.

## **ABSTRACT**

2 An electronic book selection and delivery system distributes text to subscribers.  
3 The system provides for on-demand and virtual on-demand delivery of electronic books.  
4 Specified electronic books may be broadcast to a set of subscribers. Alternatively, a first  
5 section of the specified electronic books may be broadcast. A second section of each of  
6 the electronic books is then available for later delivery, upon order by a subscriber. The  
7 second sections, as well as first sections, and true on-demand electronic books may be  
8 loaded into one or more queues. The queues may then be emptied based on a priority  
9 model. Electronic books in an on-demand queue may be given priority for delivery over  
10 electronic books in other queues.

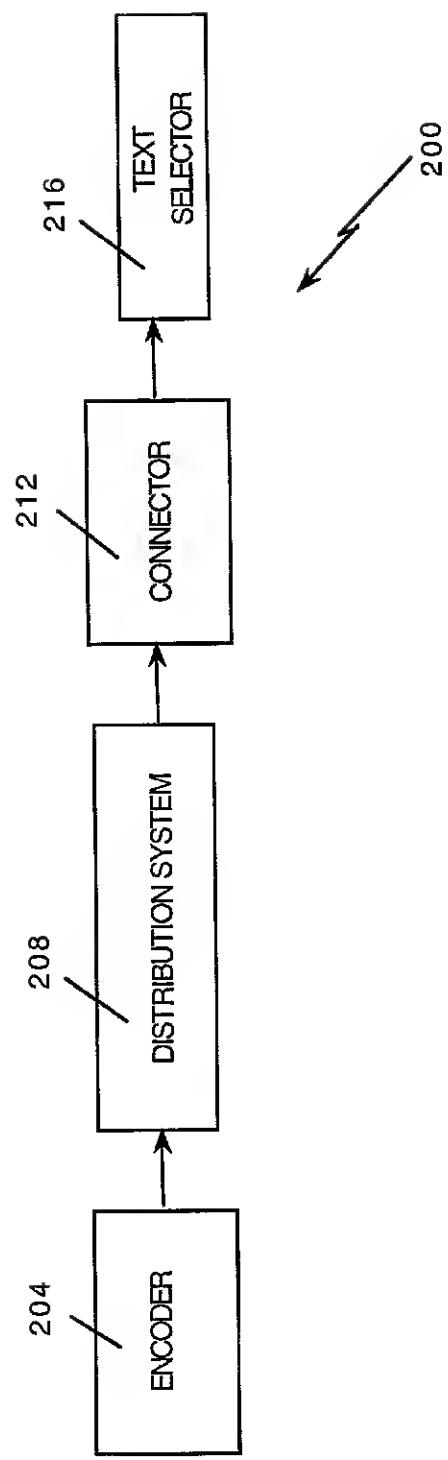
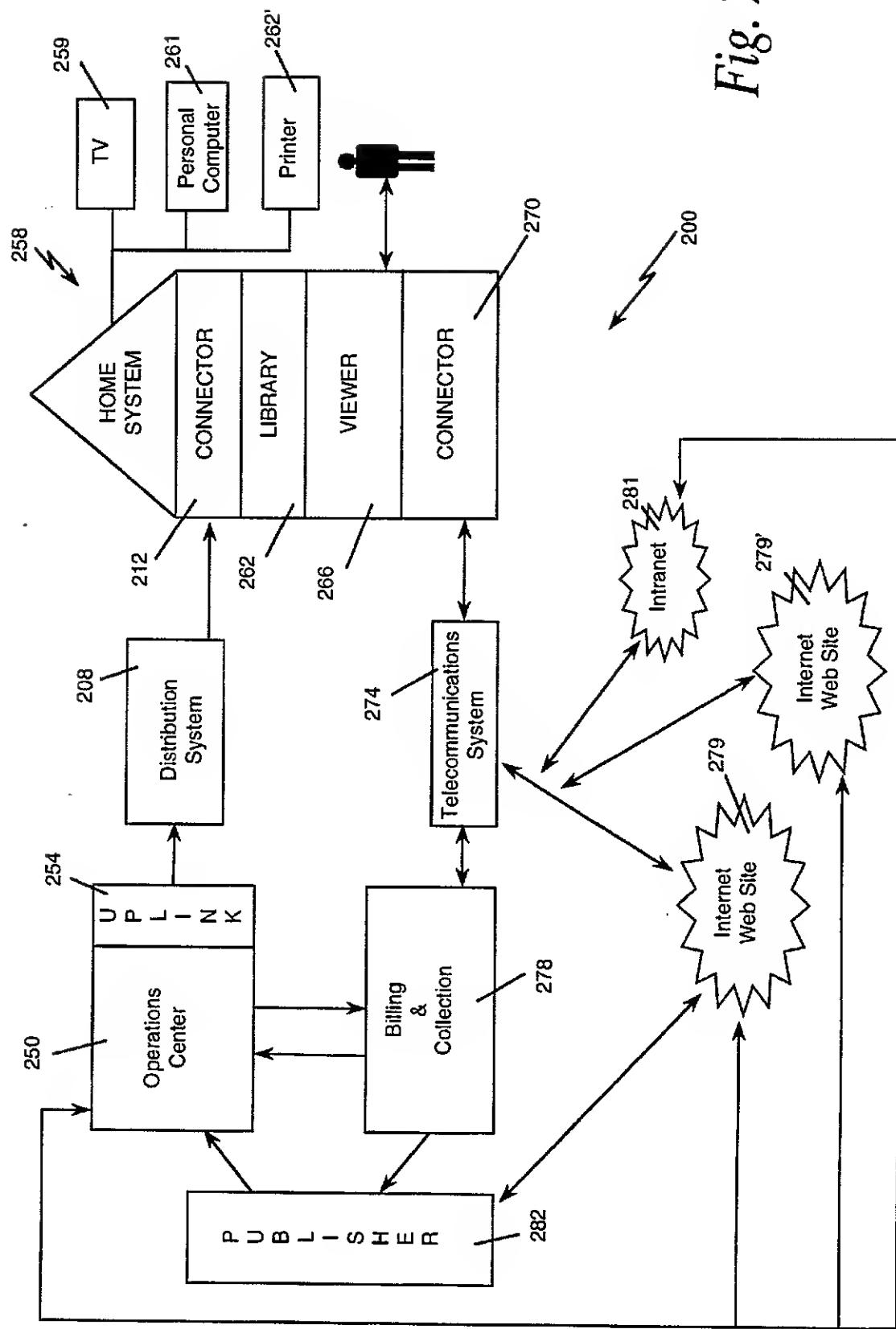


Fig. 1

Fig. 2



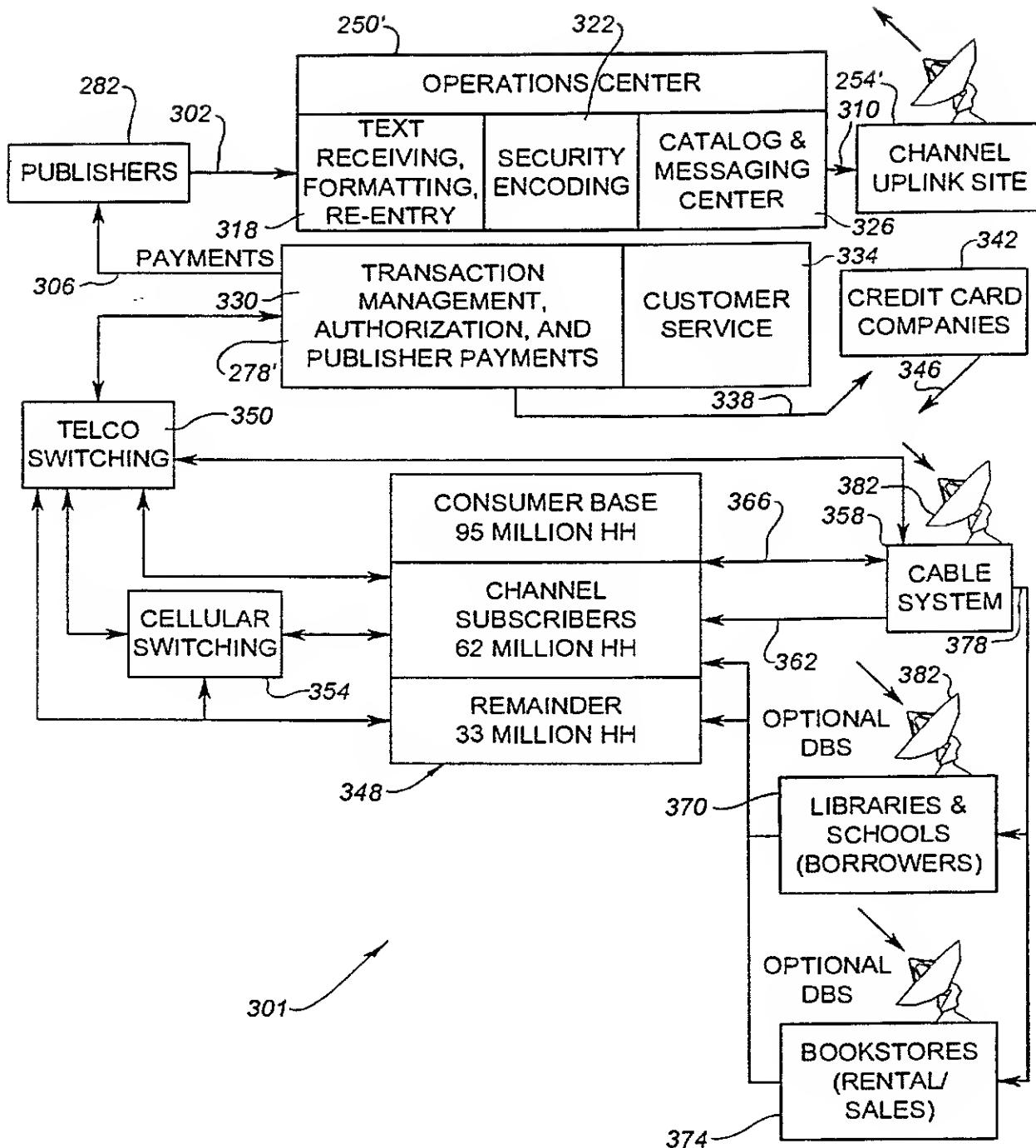
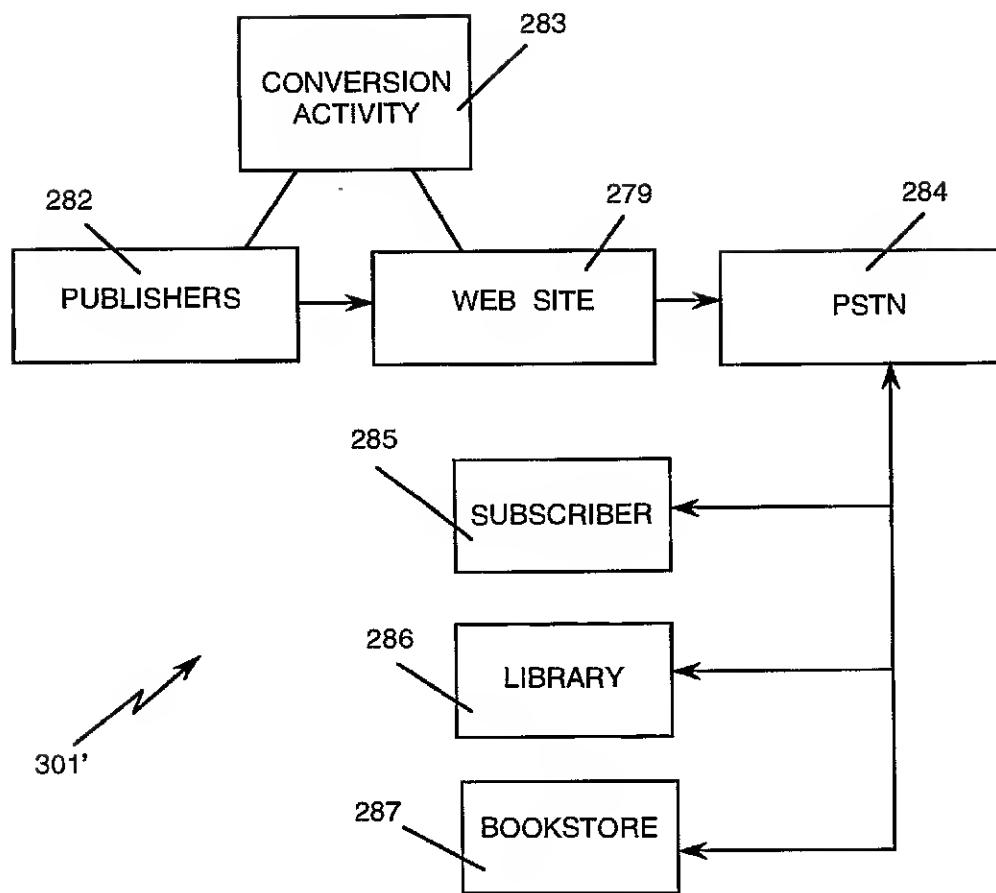
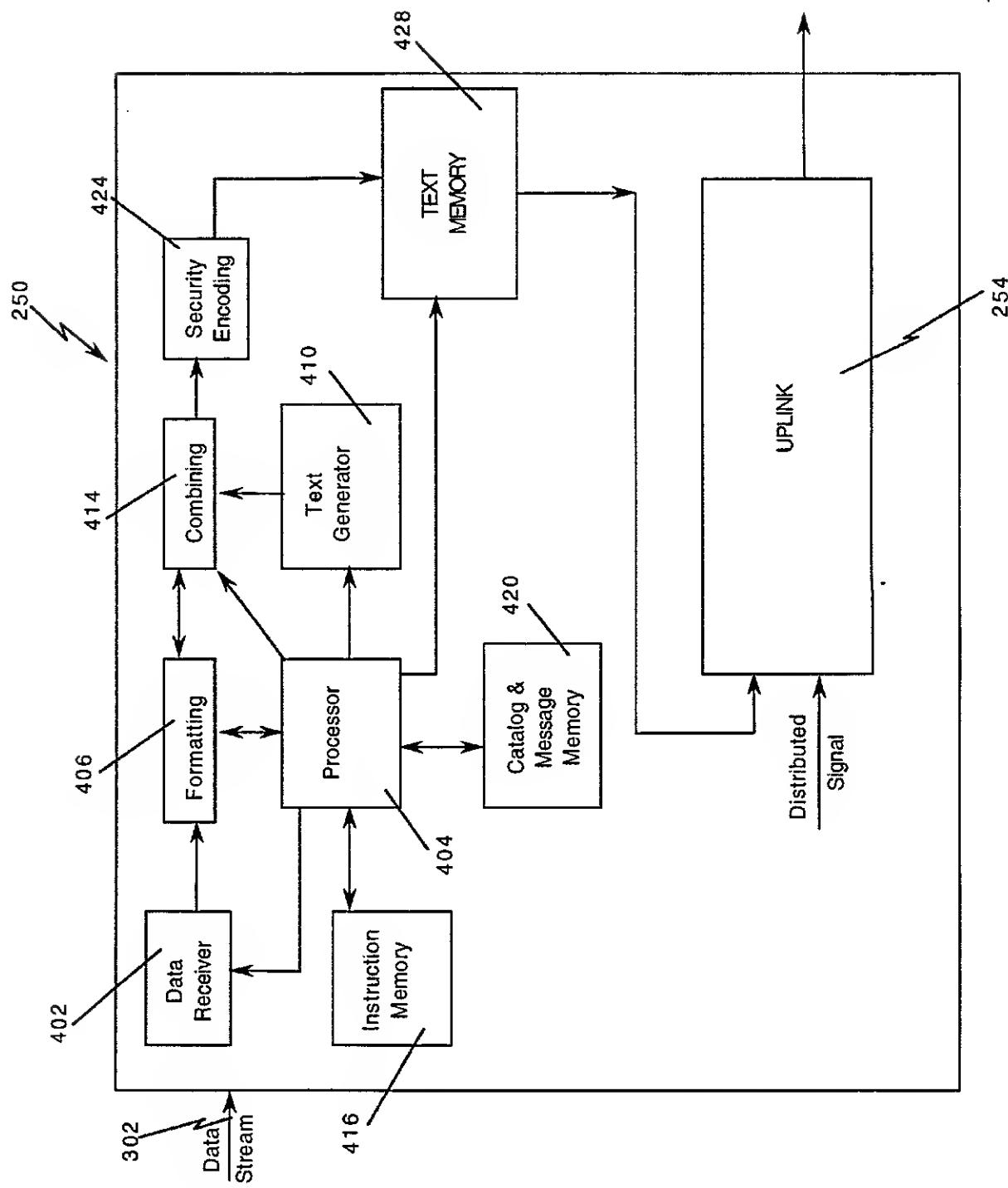


Fig. 3a



*Fig. 3b*

Fig. 4



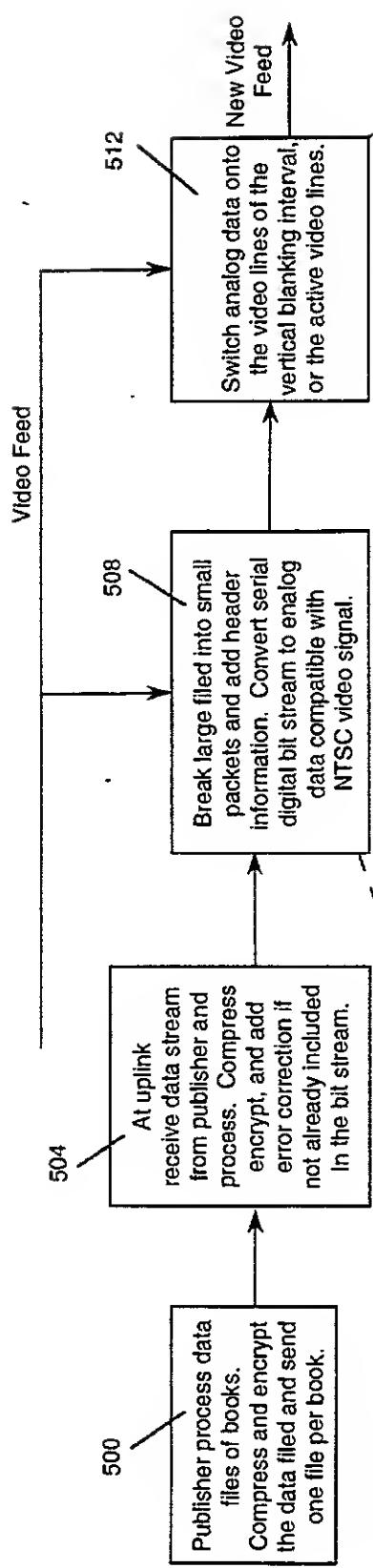


Fig. 5a

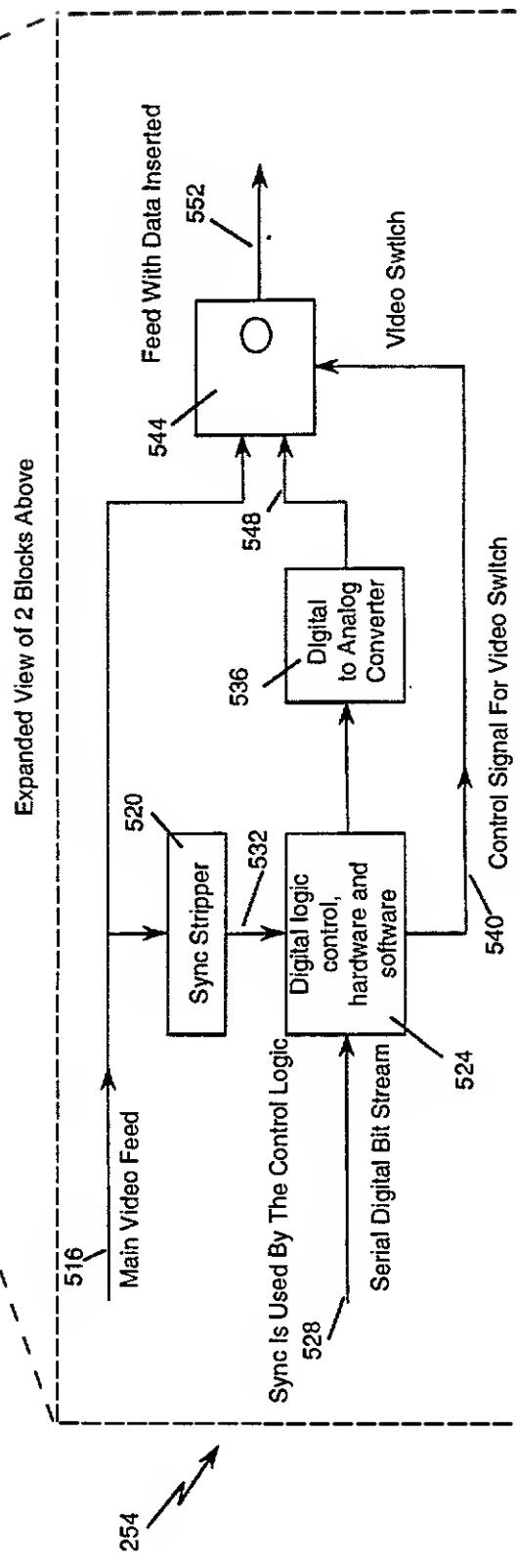


Fig. 5b

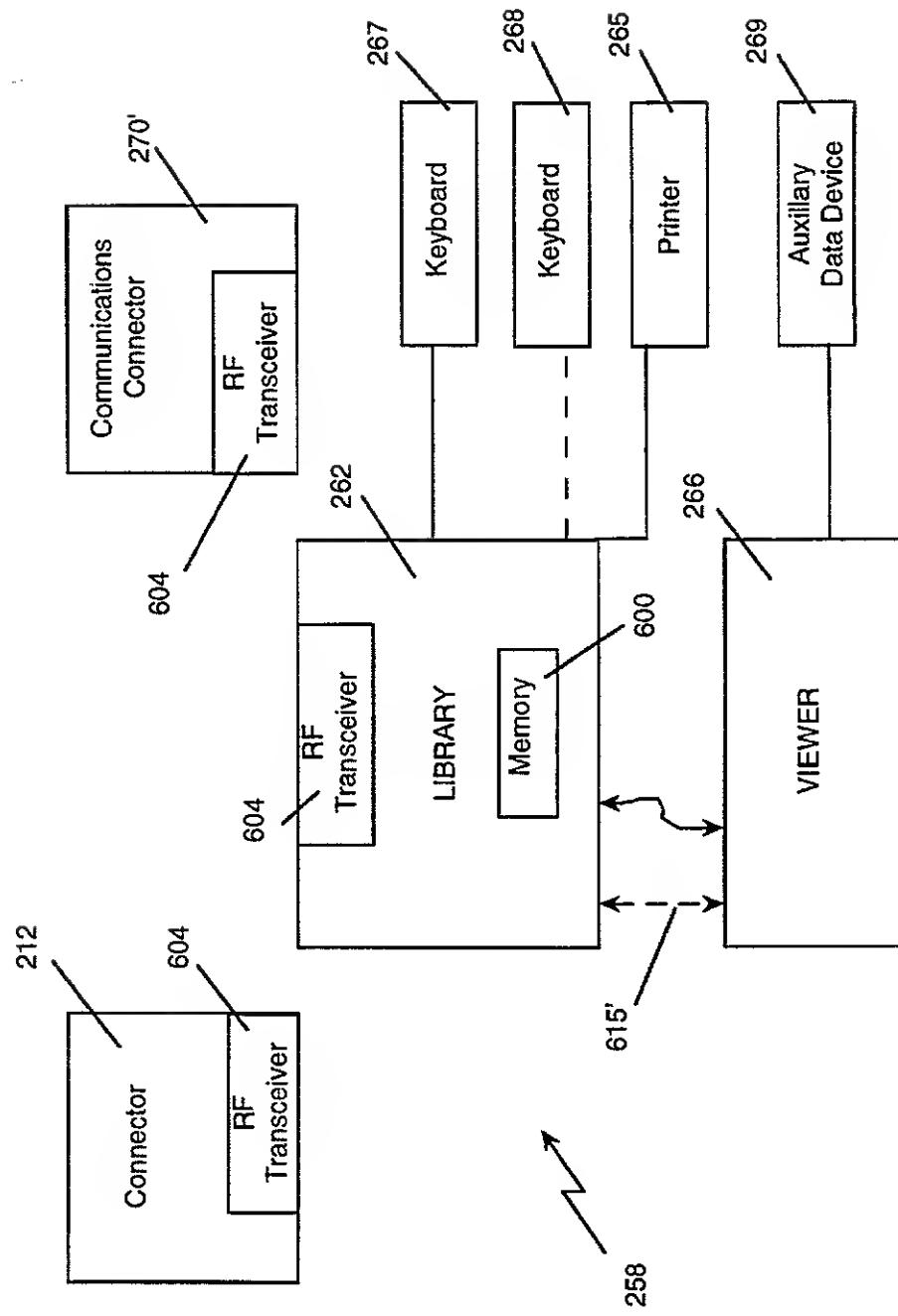


Fig. 6a

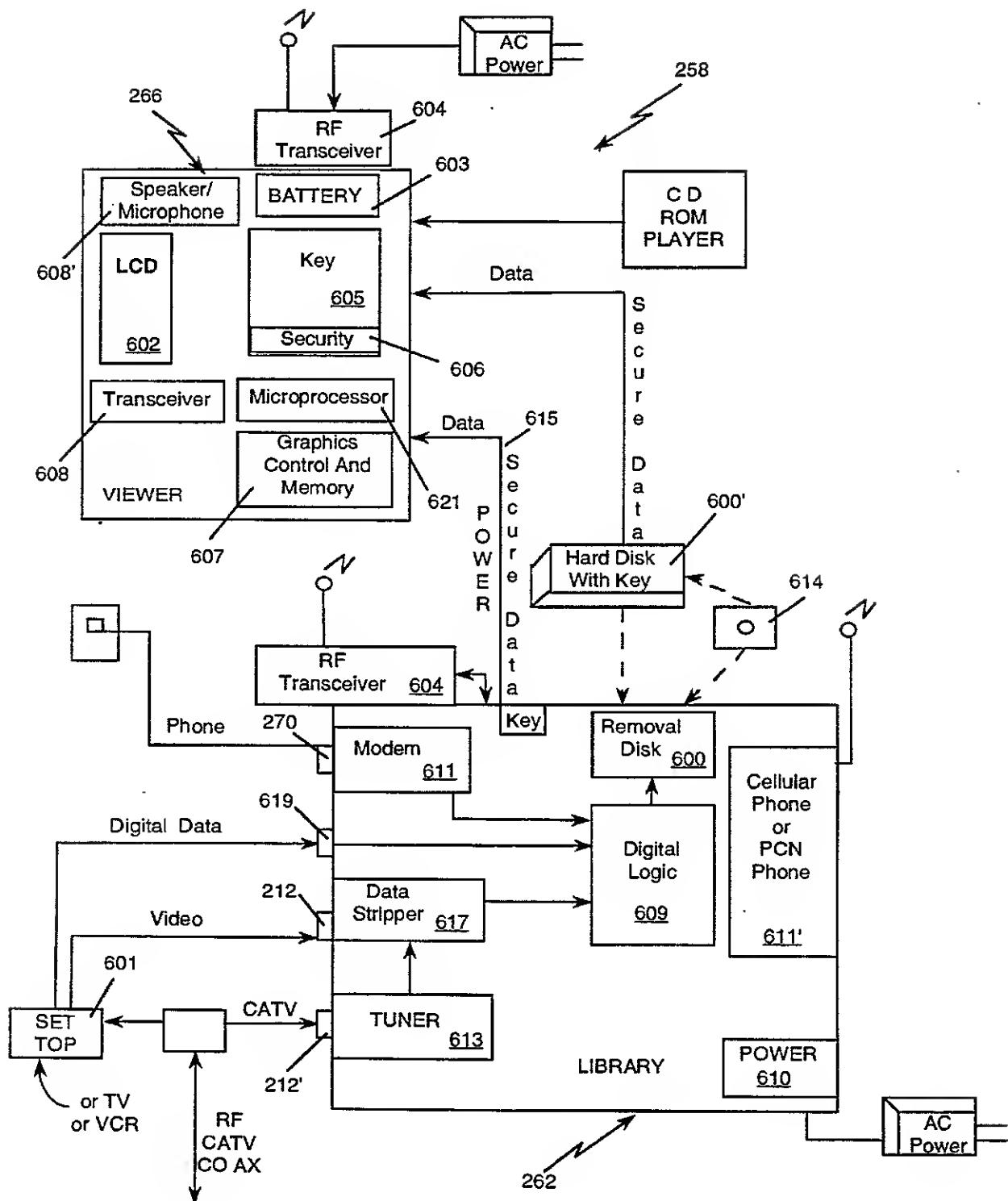
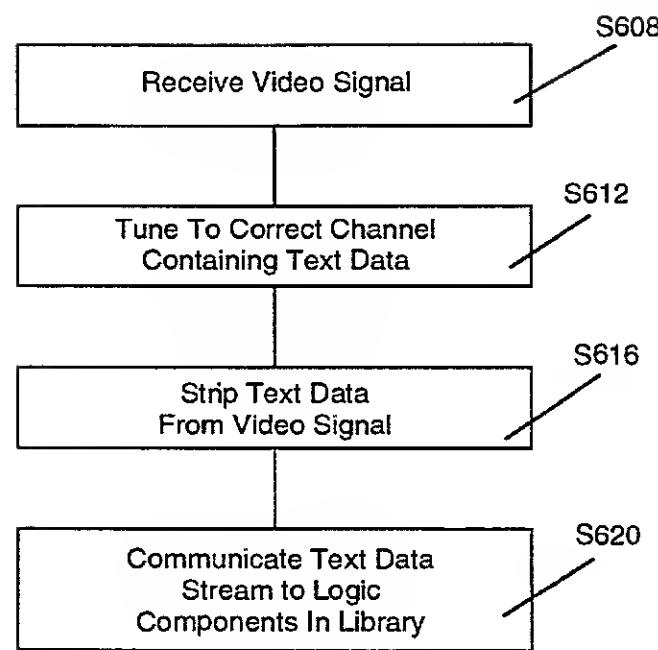


Fig. 6b



*Fig. 7*

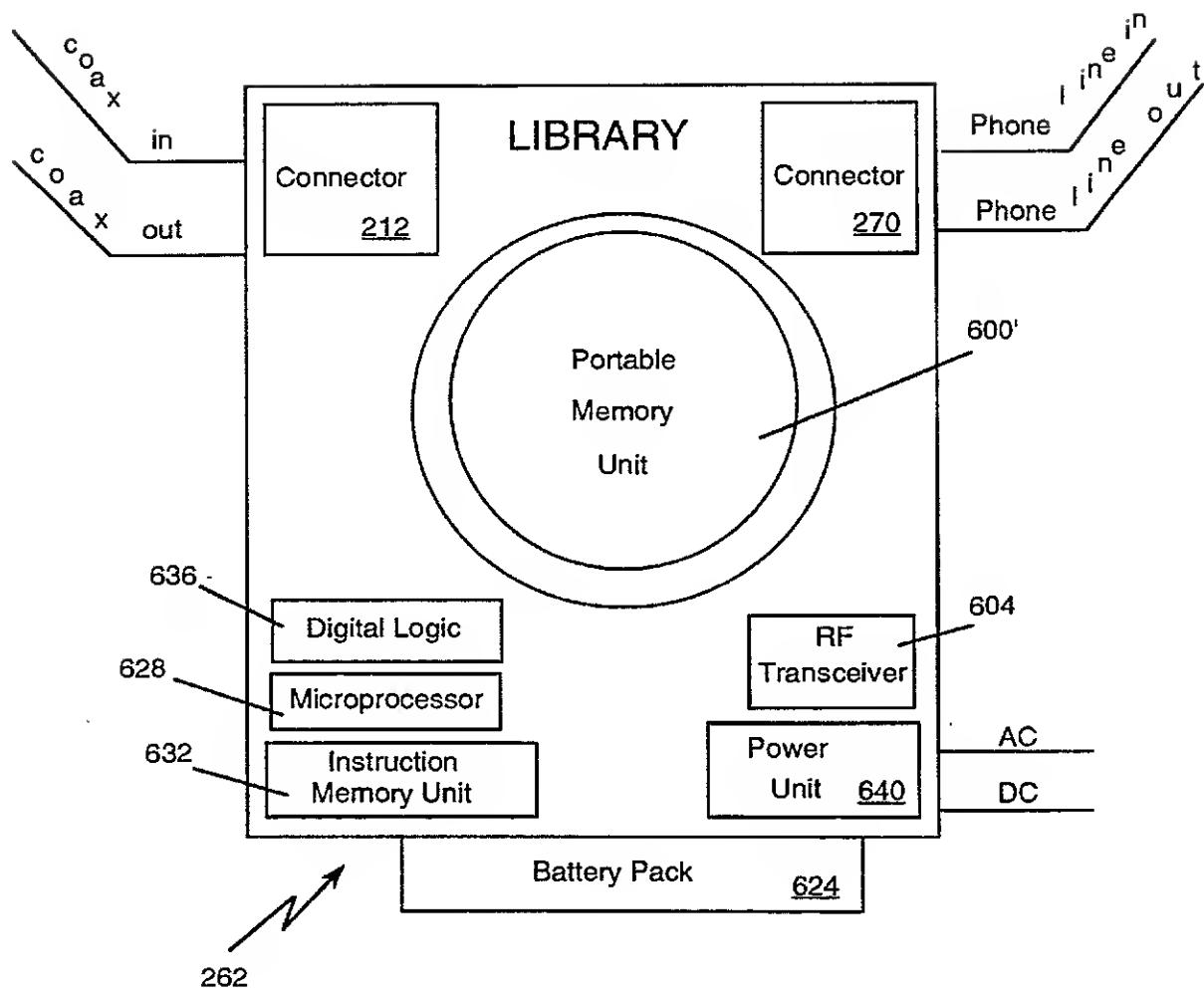


Fig. 8

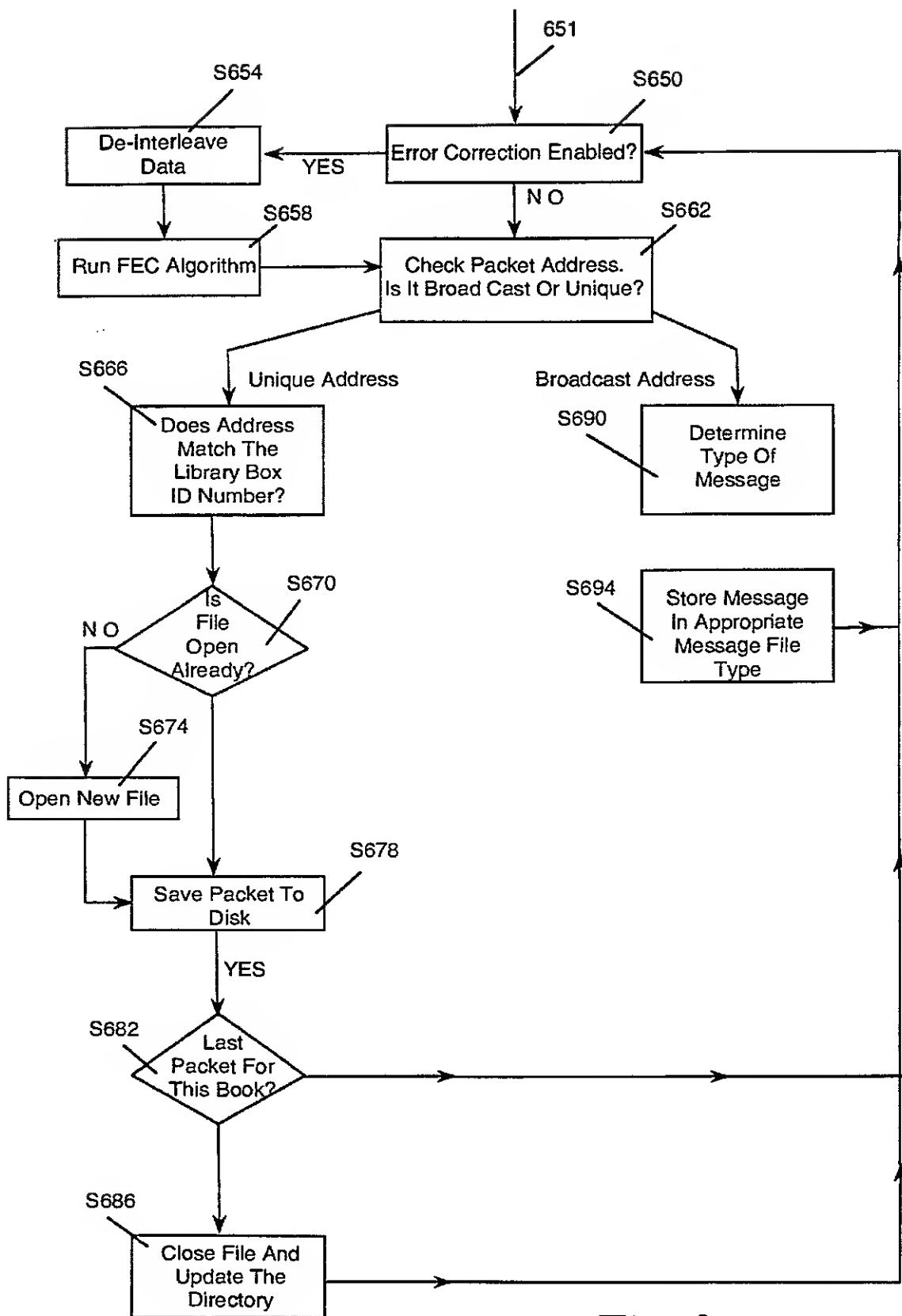


Fig. 9

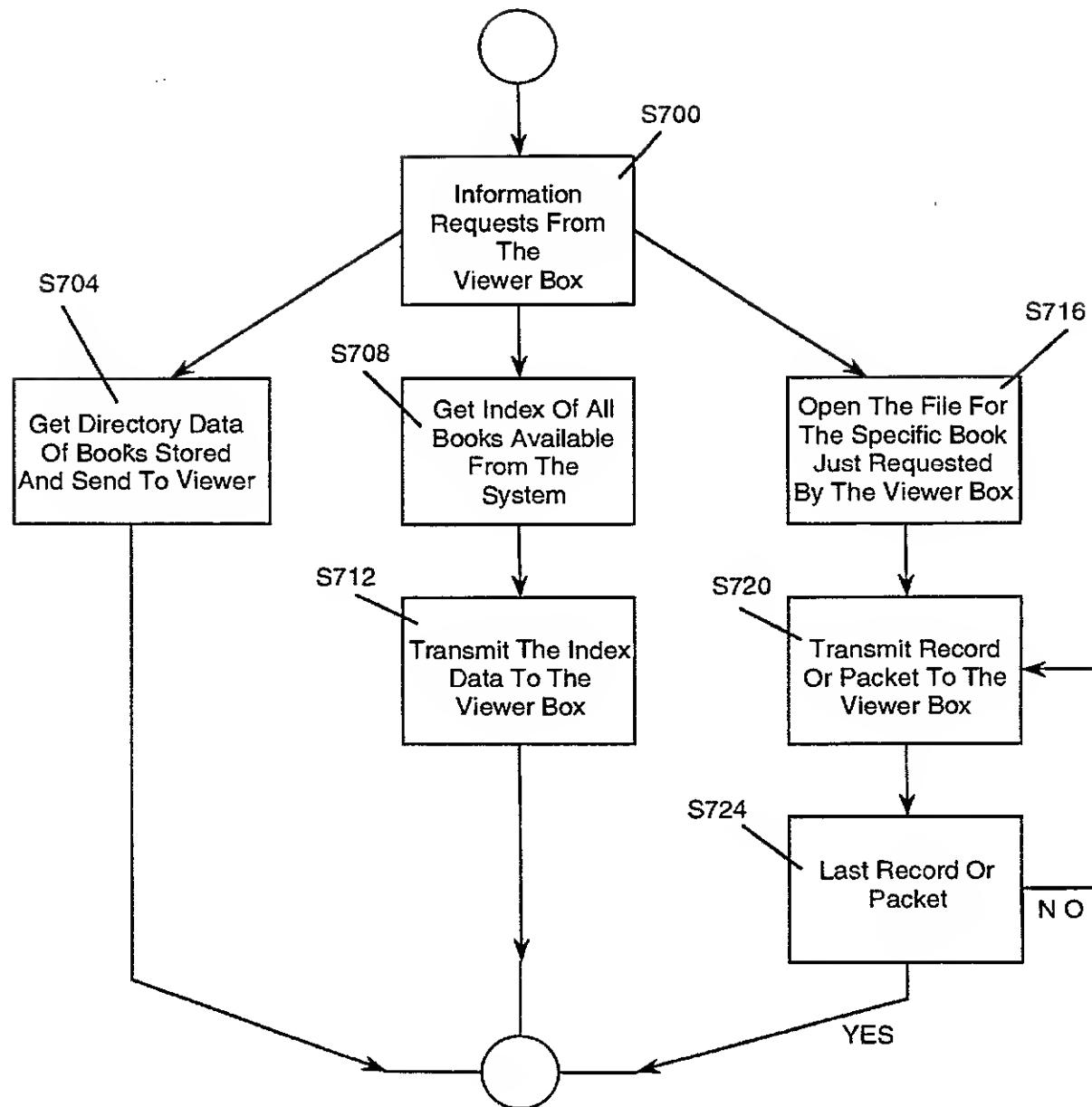
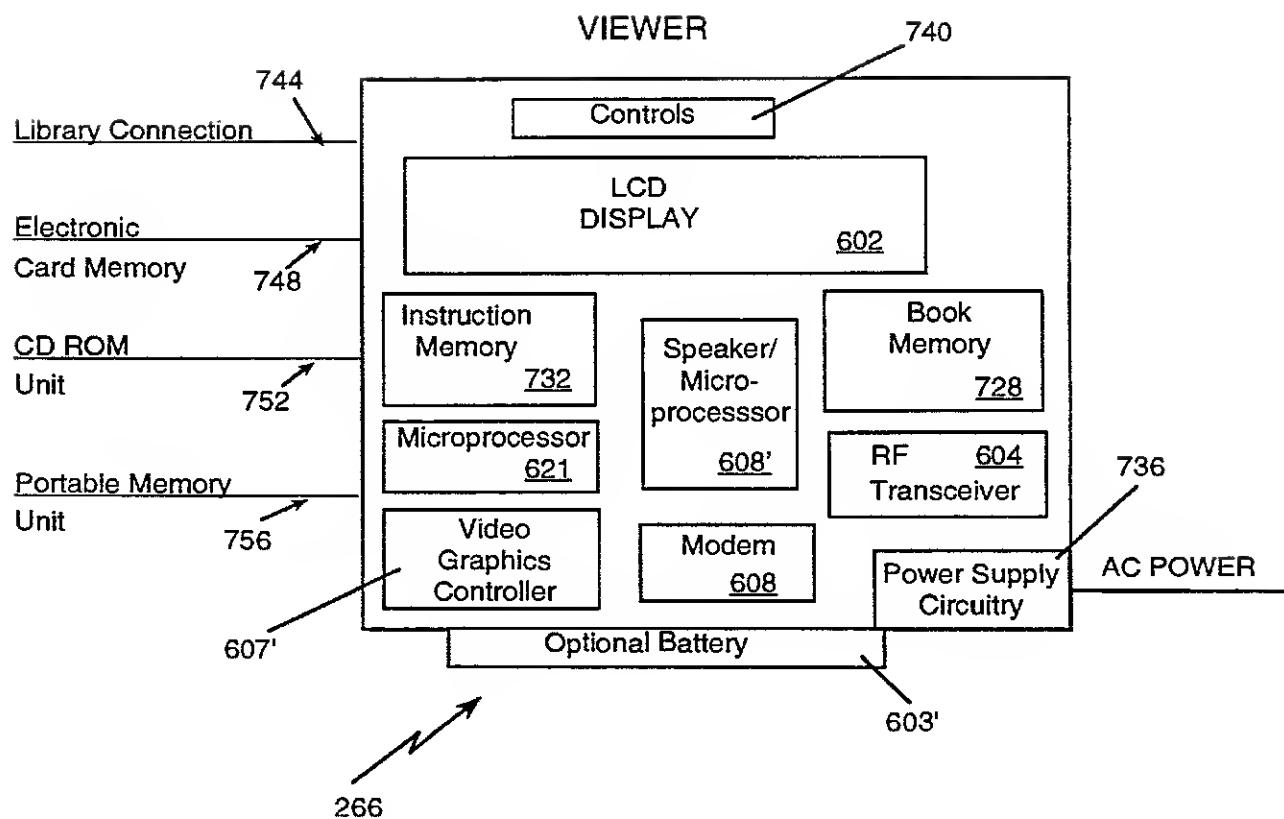


Fig. 10



*Fig. 11*

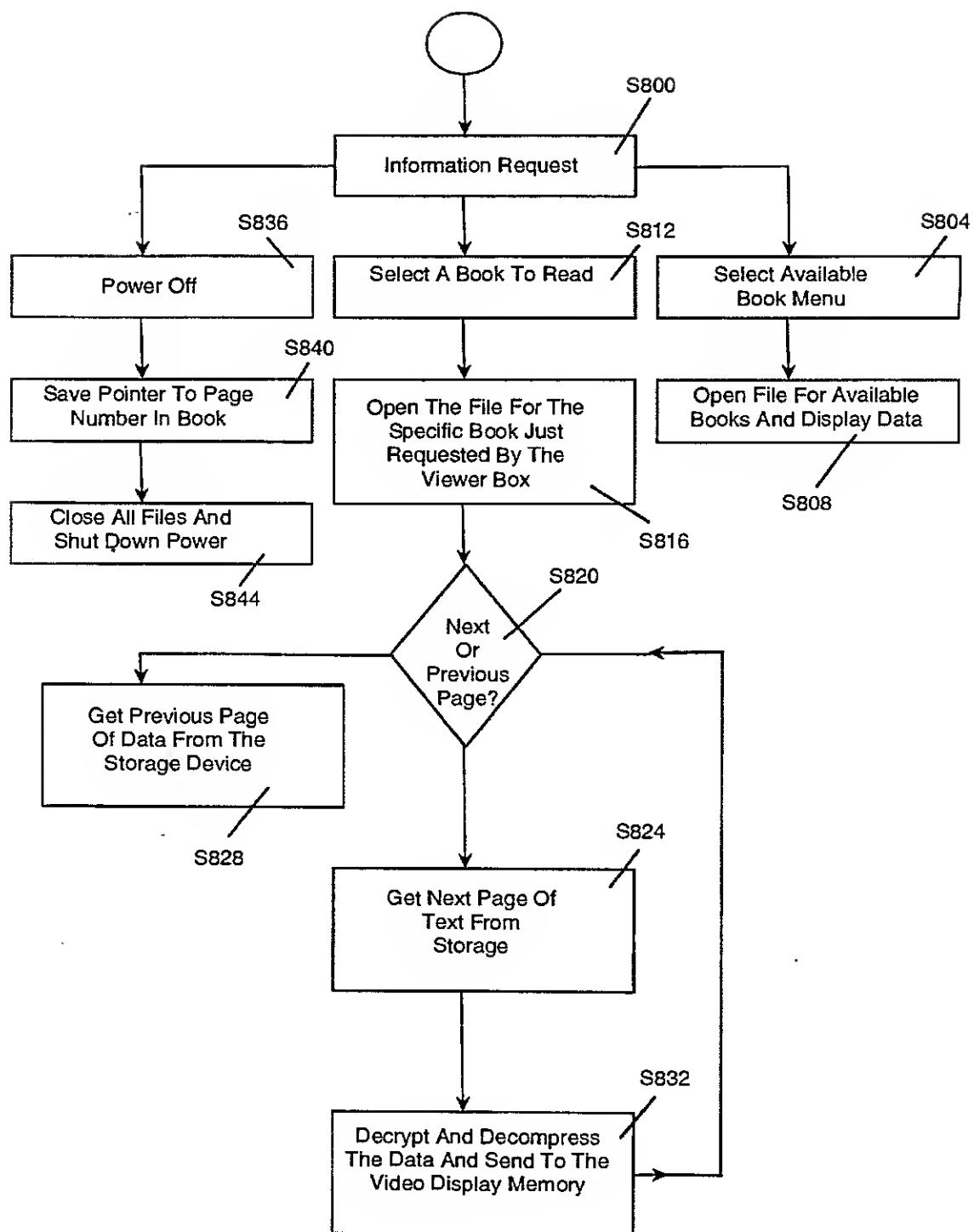


Fig. 12

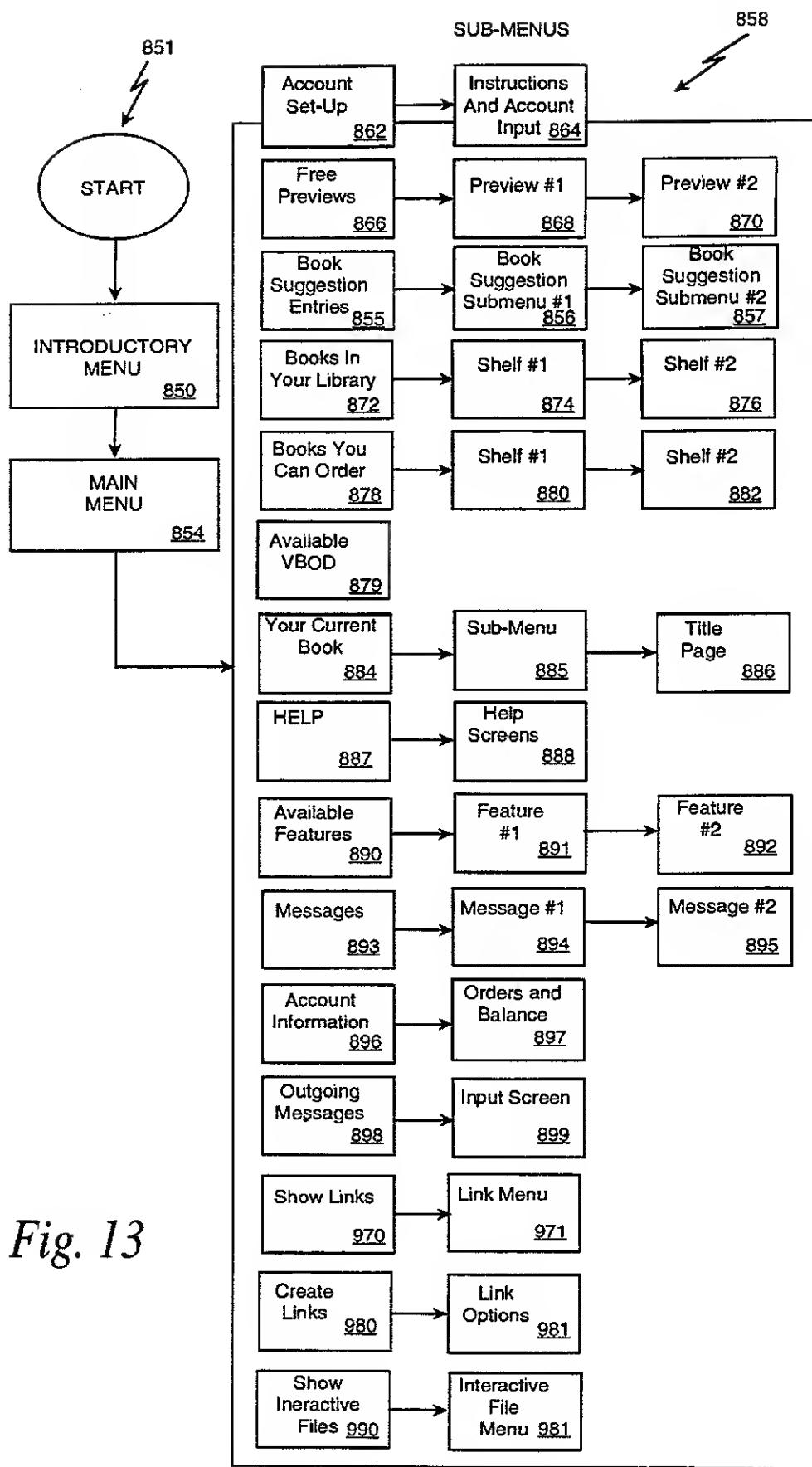
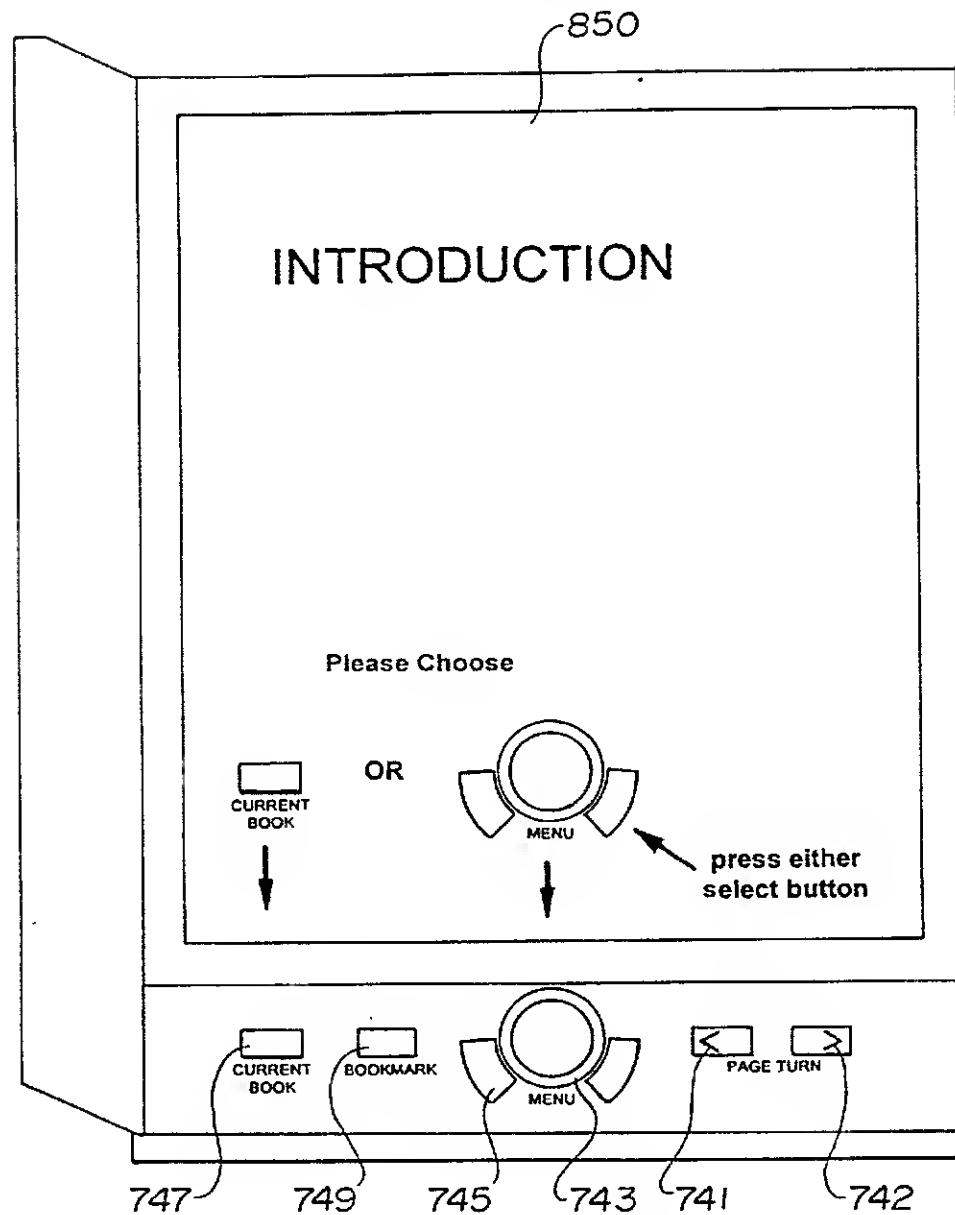
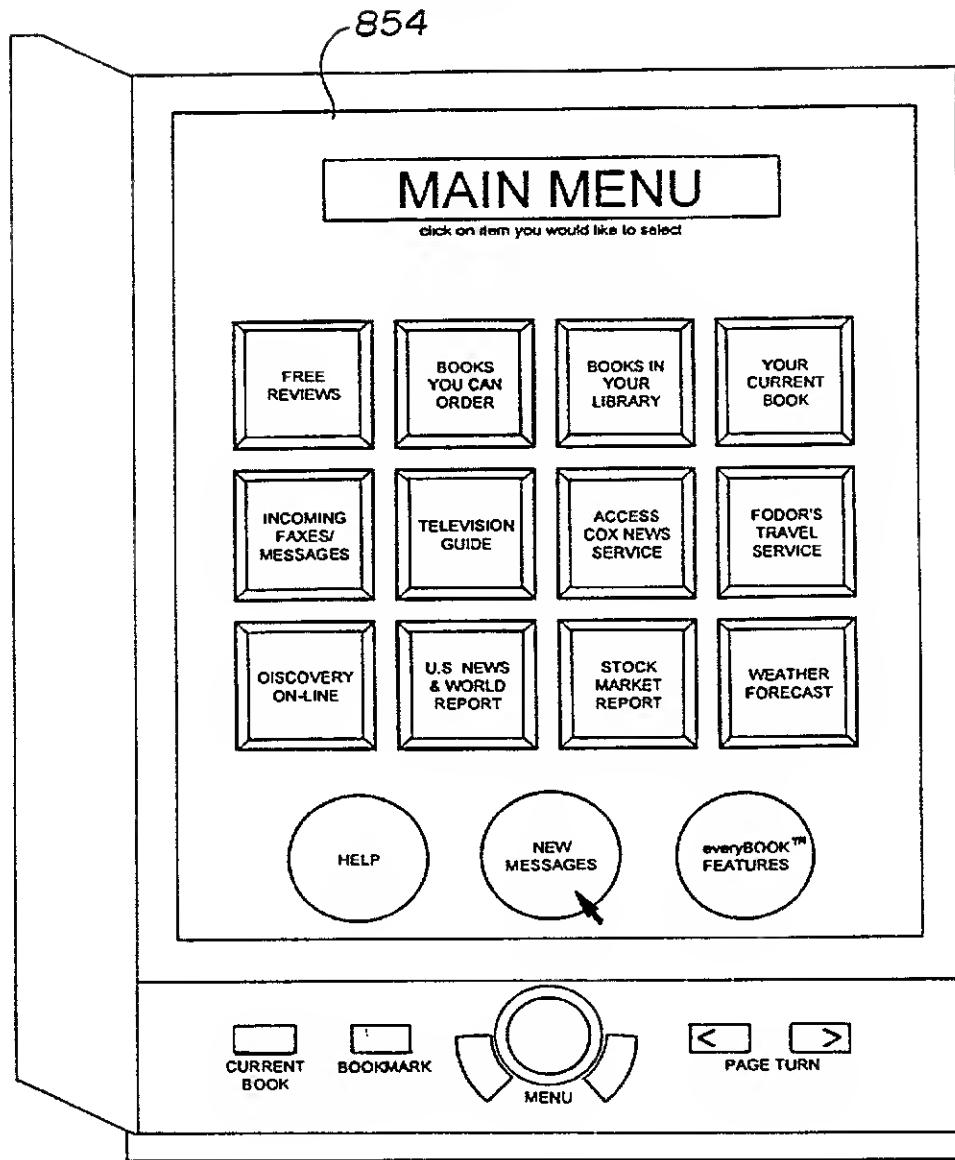


Fig. 13

*Fig. 14a*

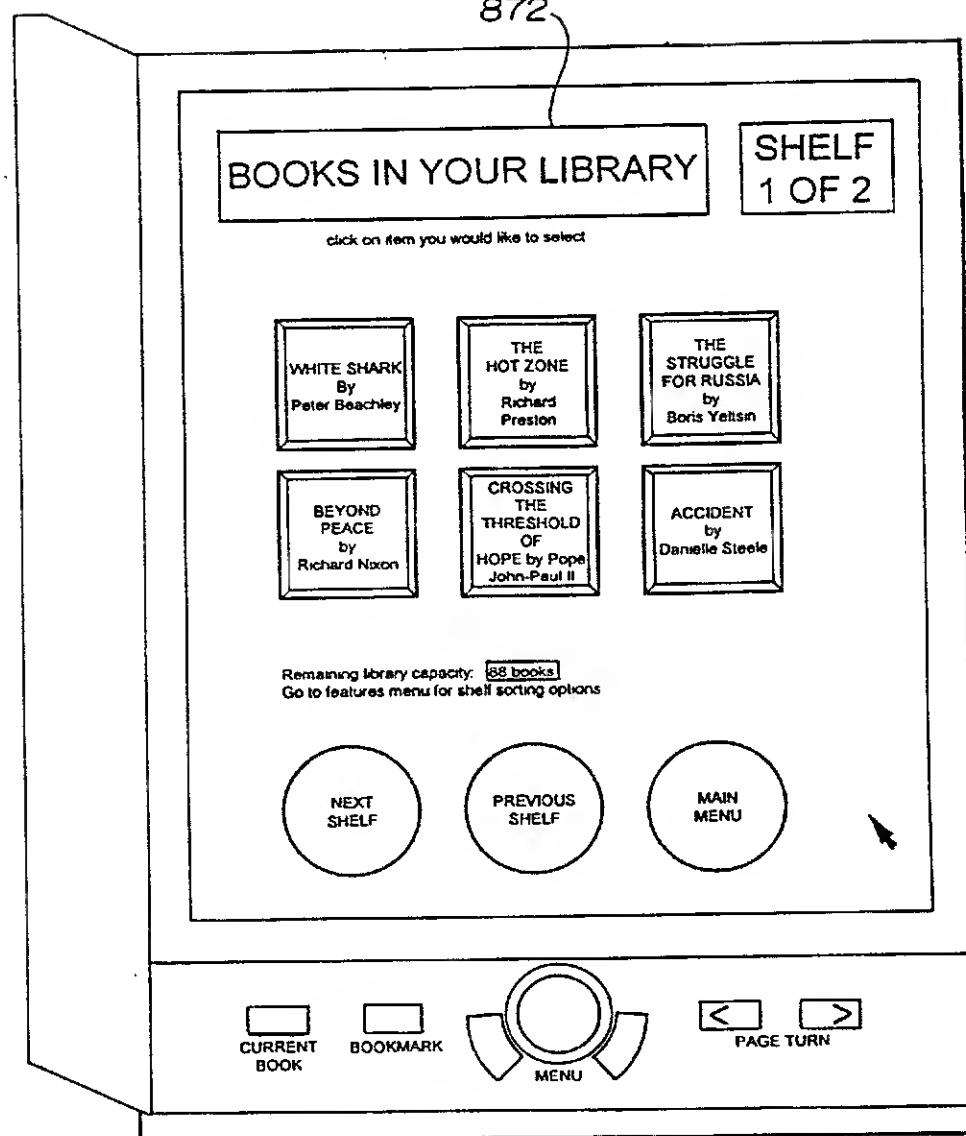


*Fig. 14b*

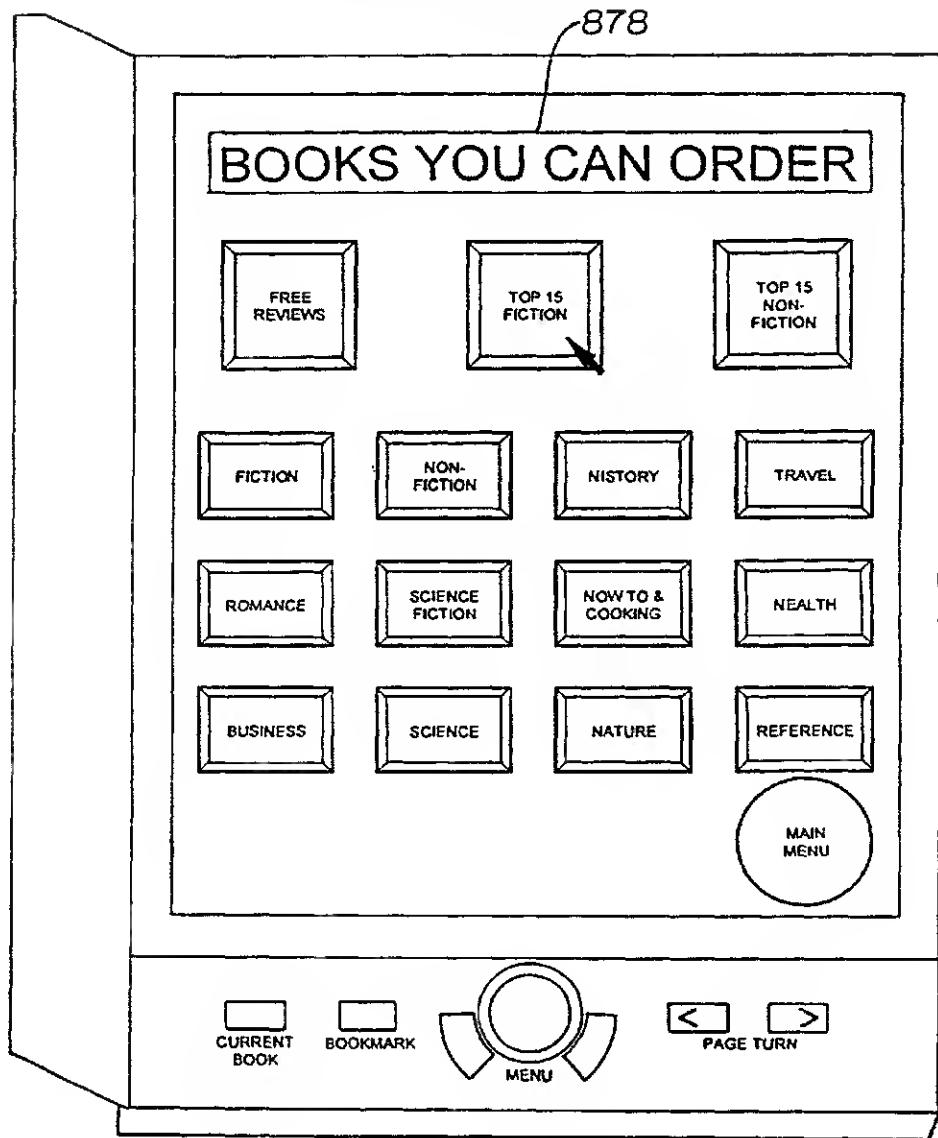


*Fig. 14c*

872

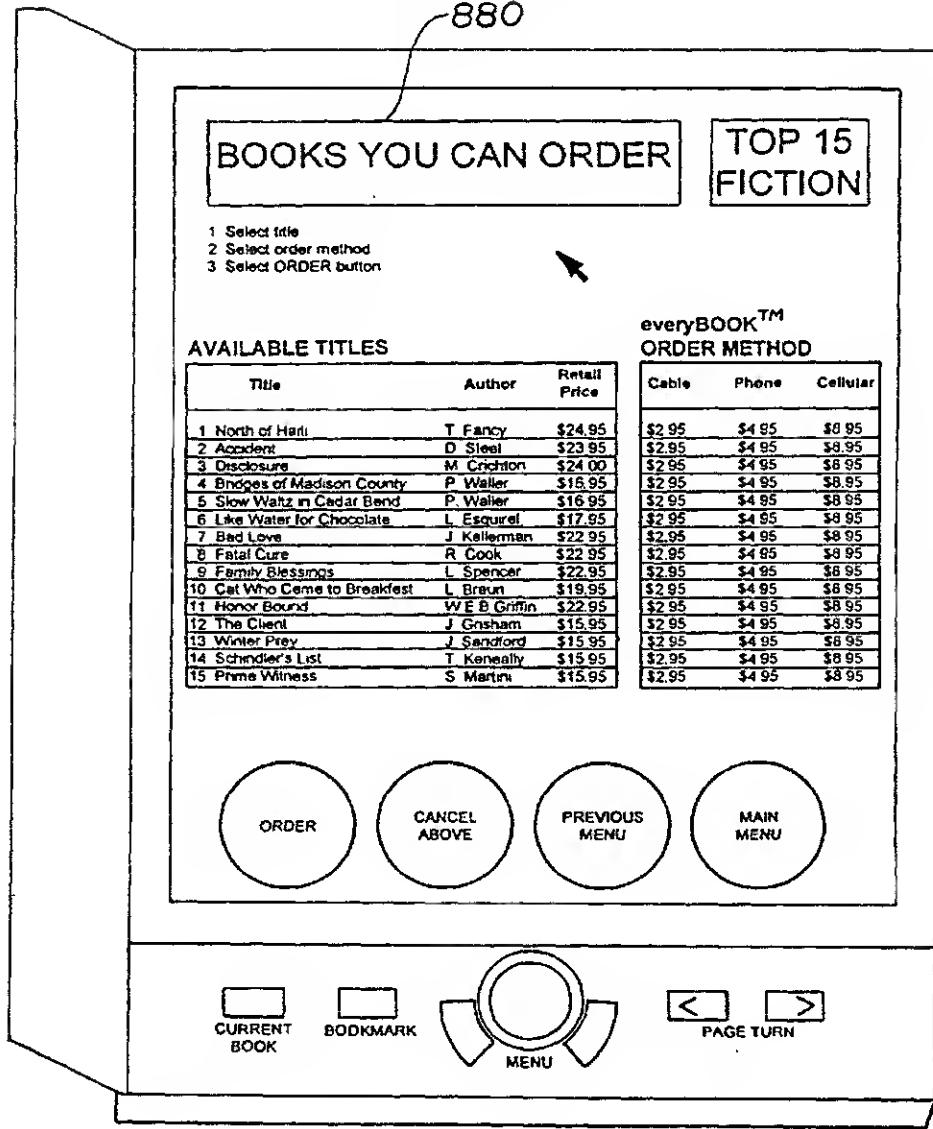


*Fig. 14d*

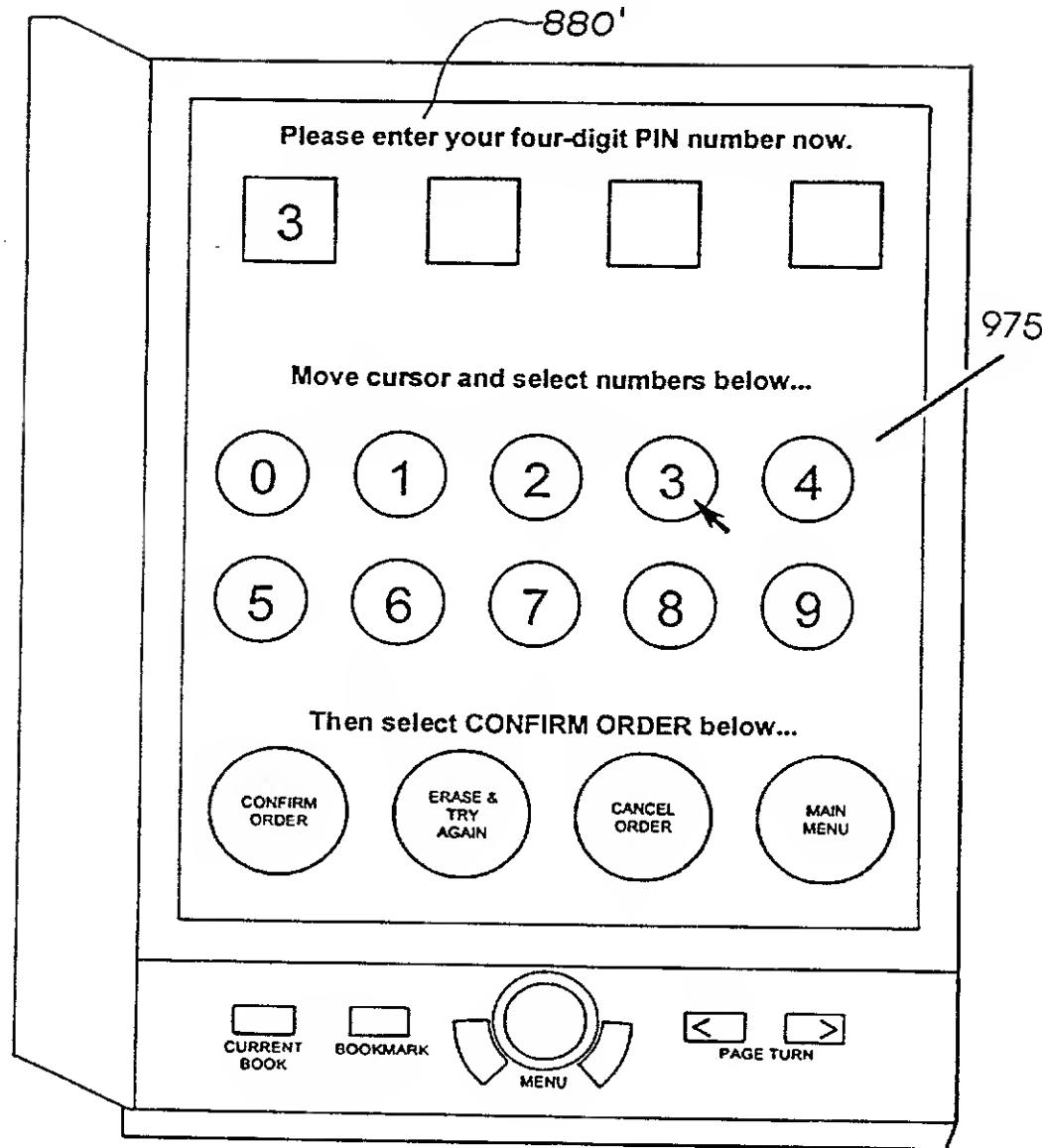


*Fig. 14e*

880

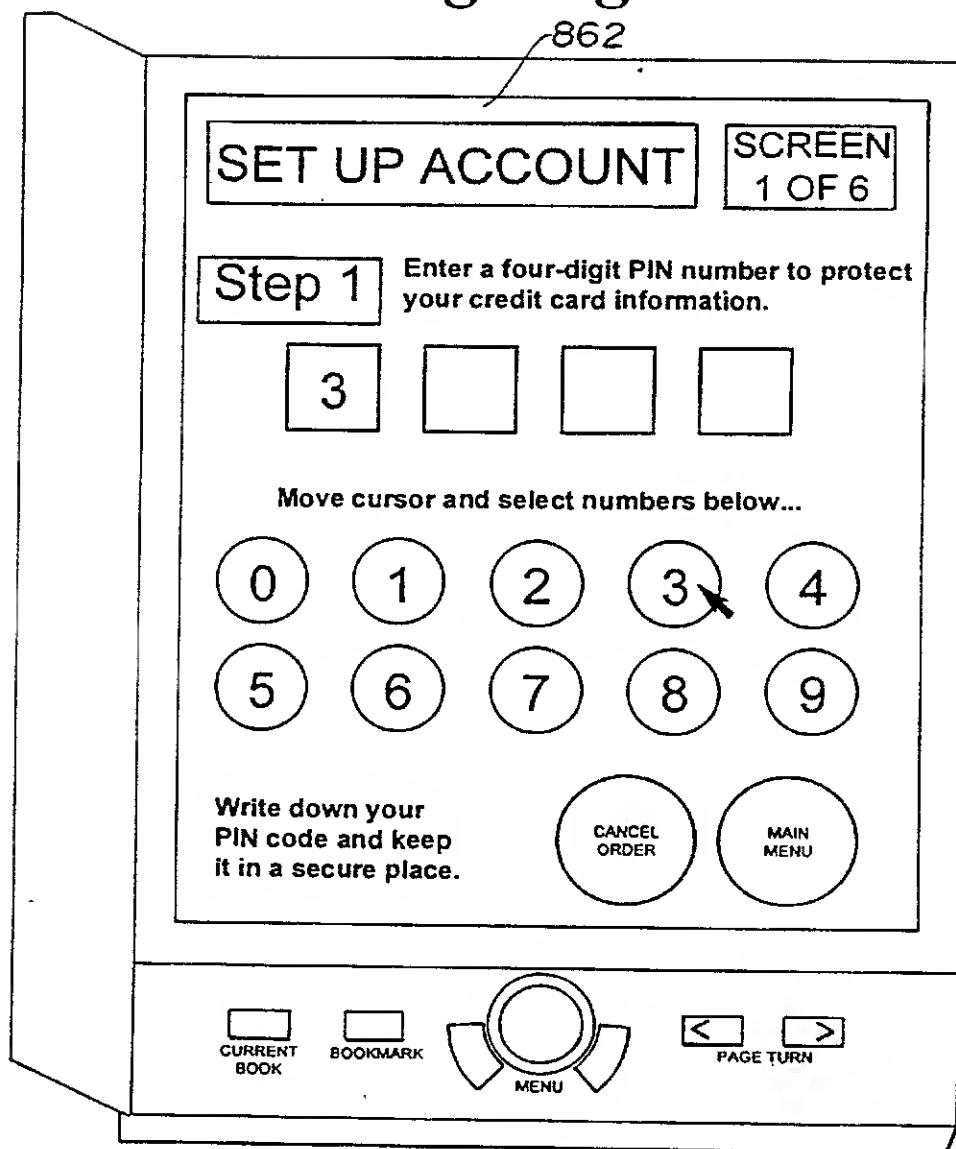


*Fig. 14f*



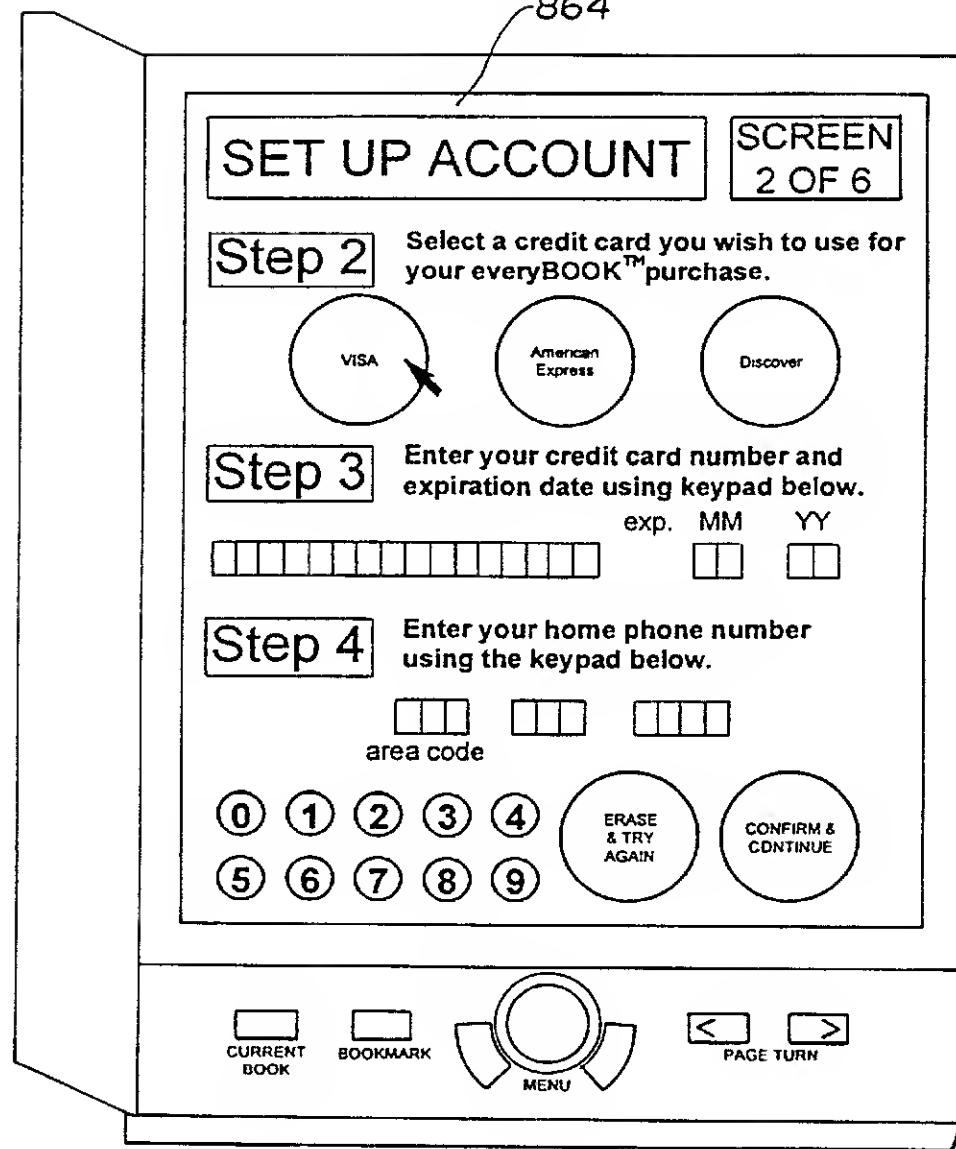
*Fig. 14g*

862



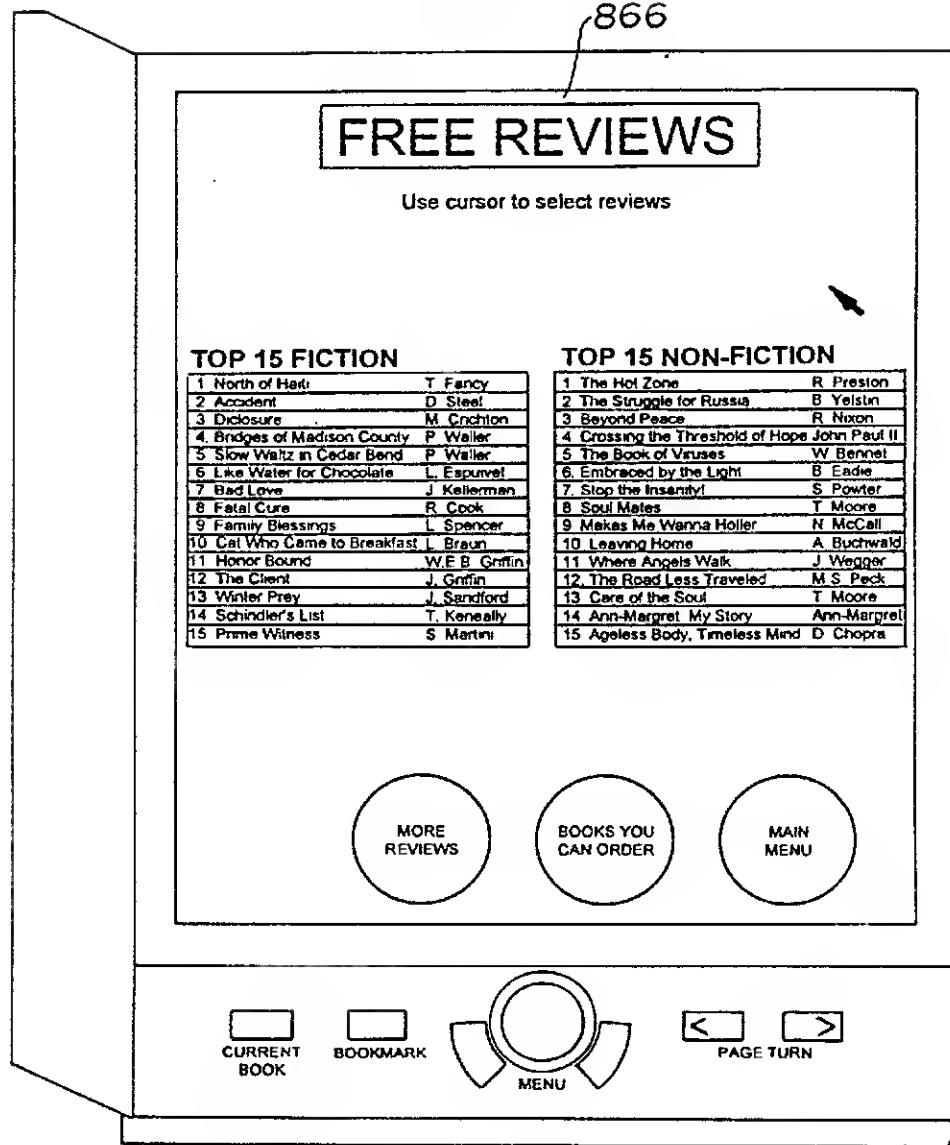
*Fig. 14h*

864



*Fig. 14i*

866



*Fig. 14j*

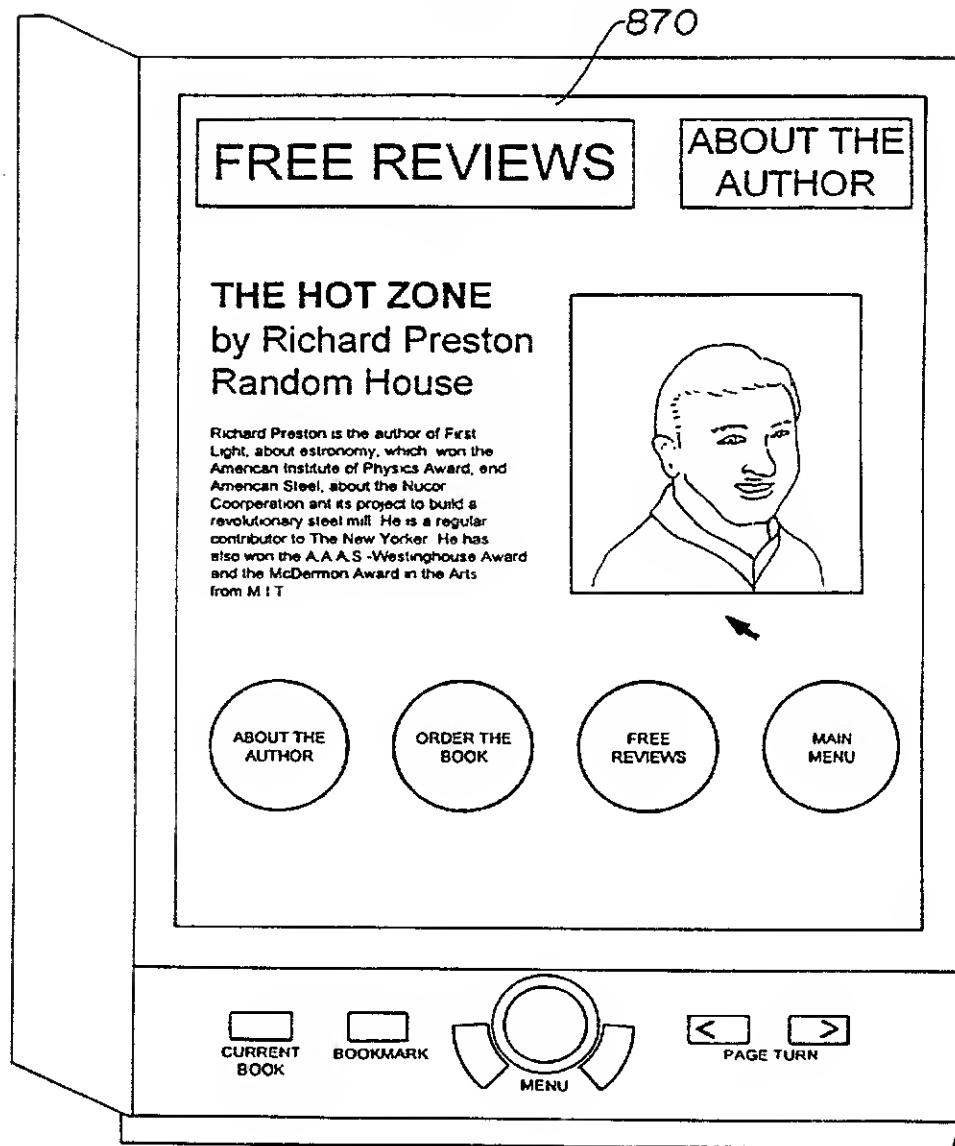
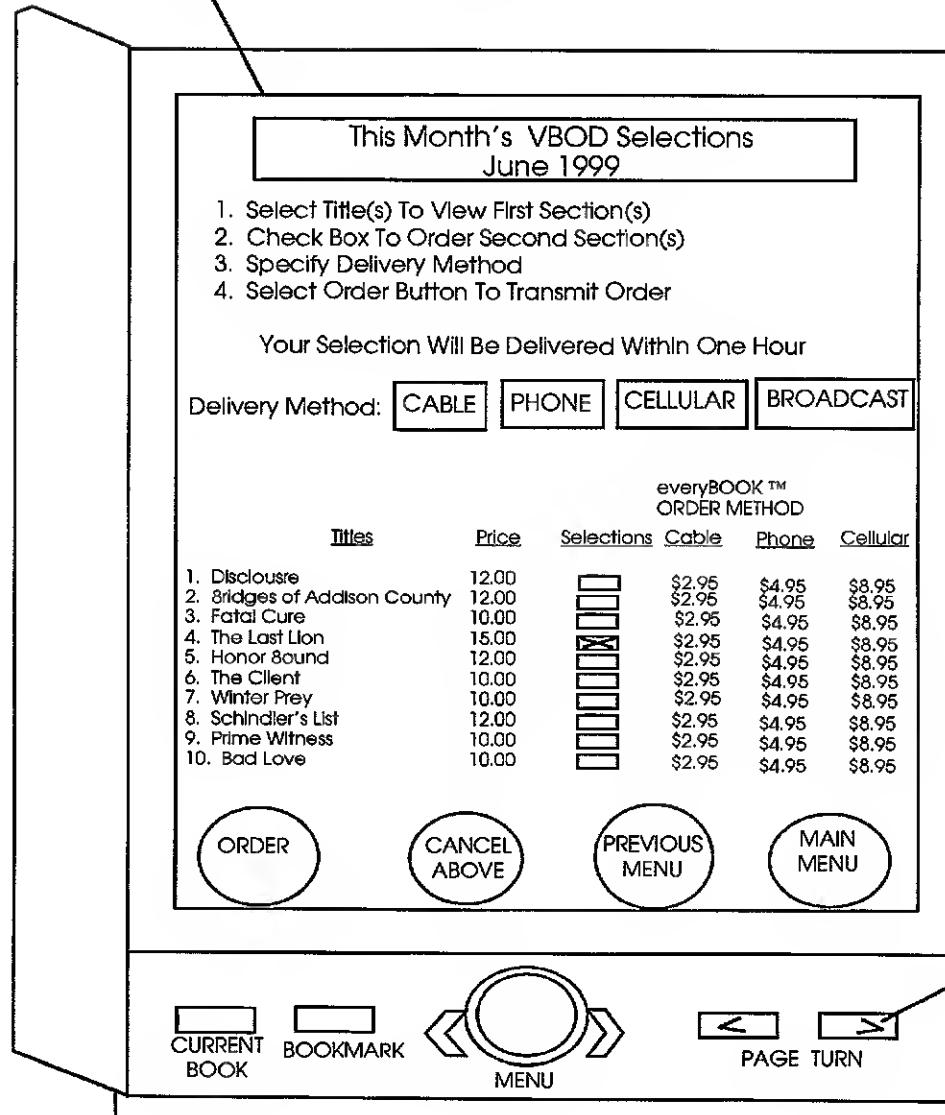


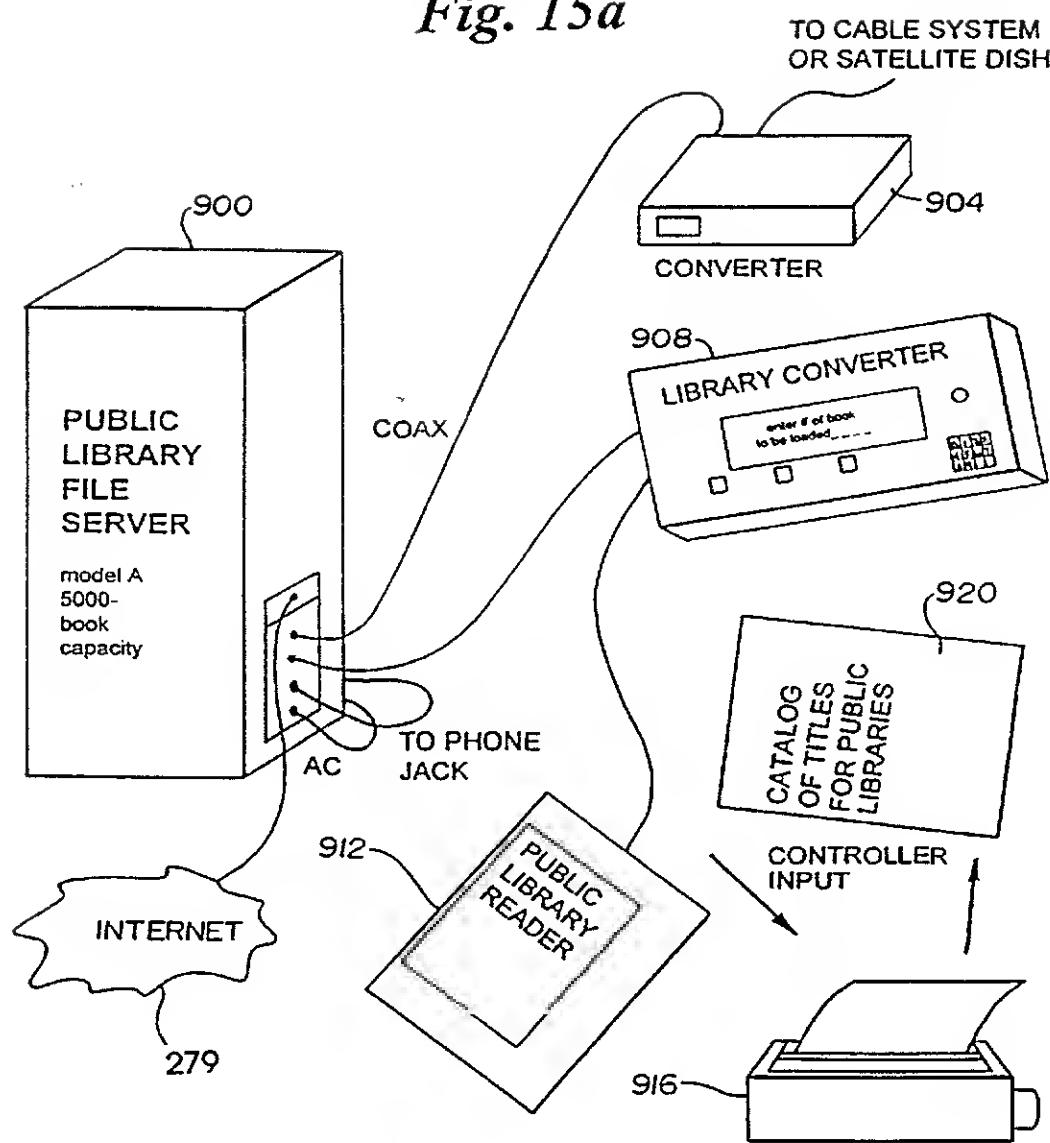
Fig. 14k

879

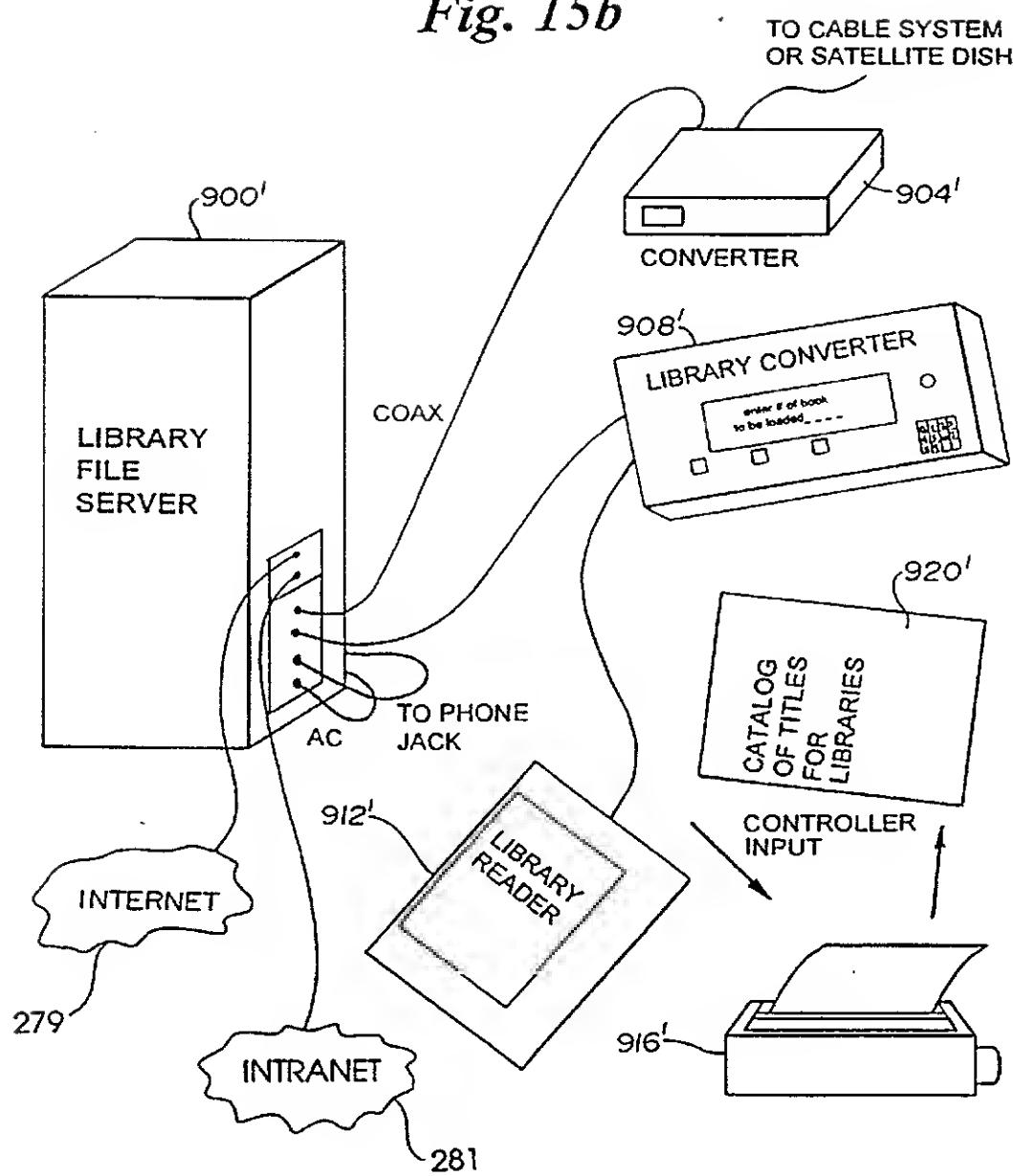


742

*Fig. 15a*



*Fig. 15b*



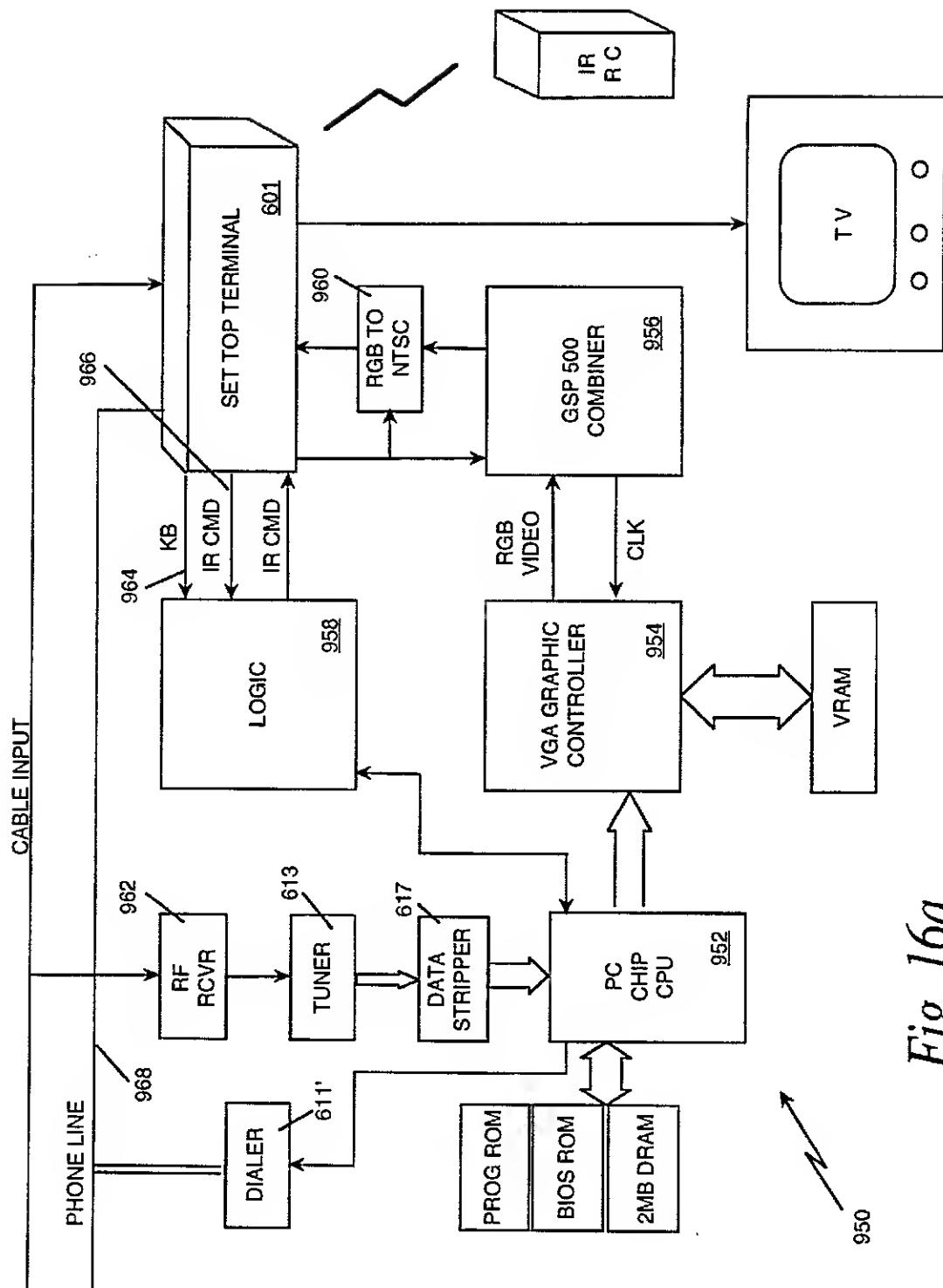


Fig. 16a

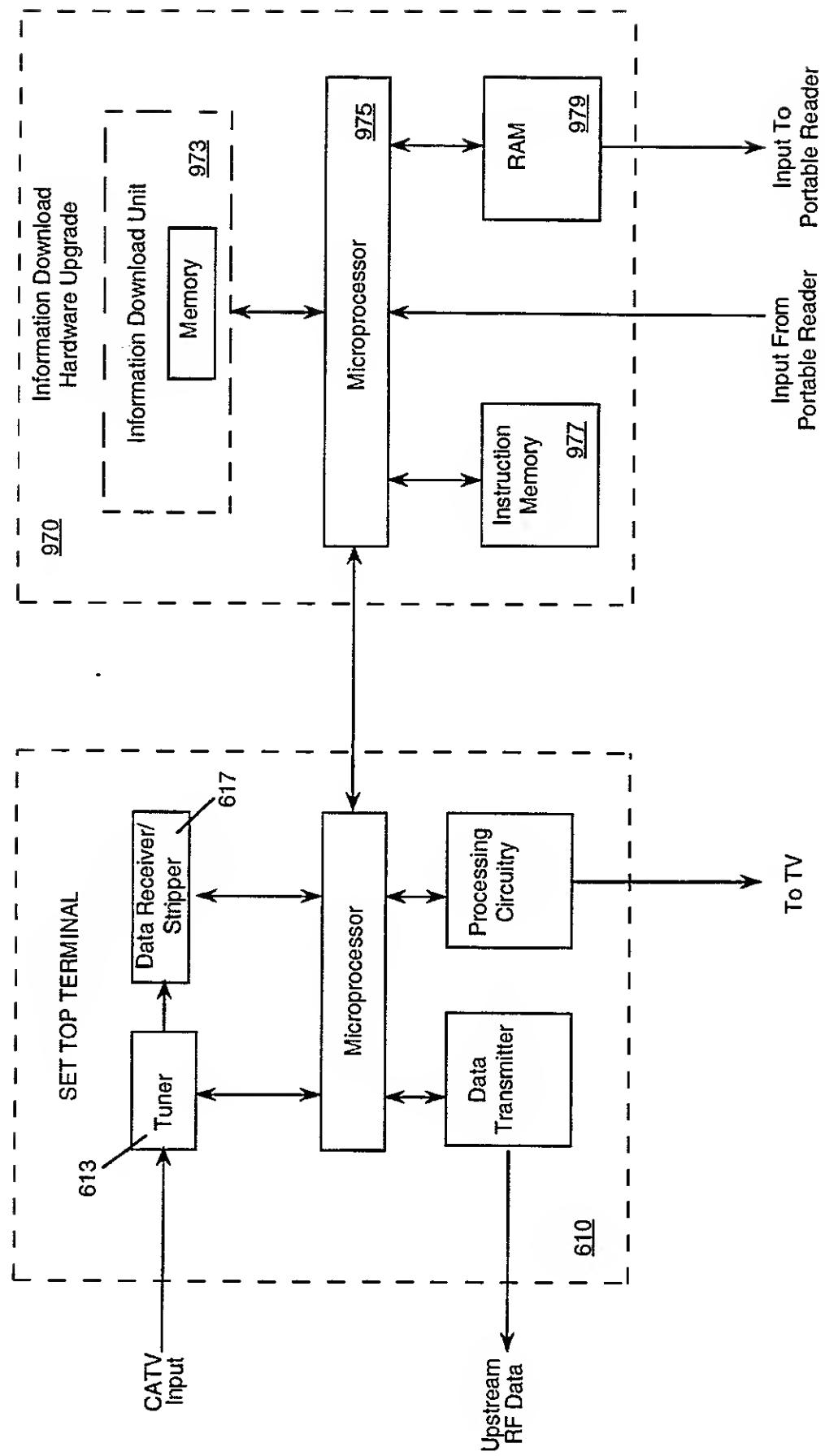
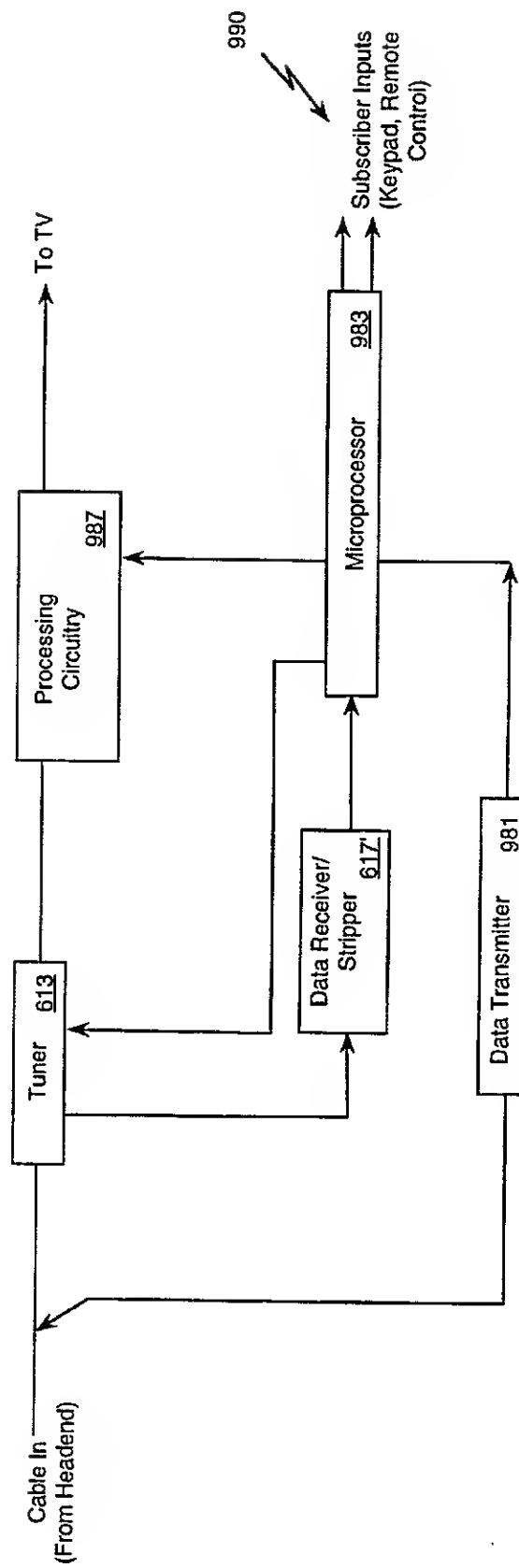


Fig. 16b

Fig. 17



*Fig. 18a*

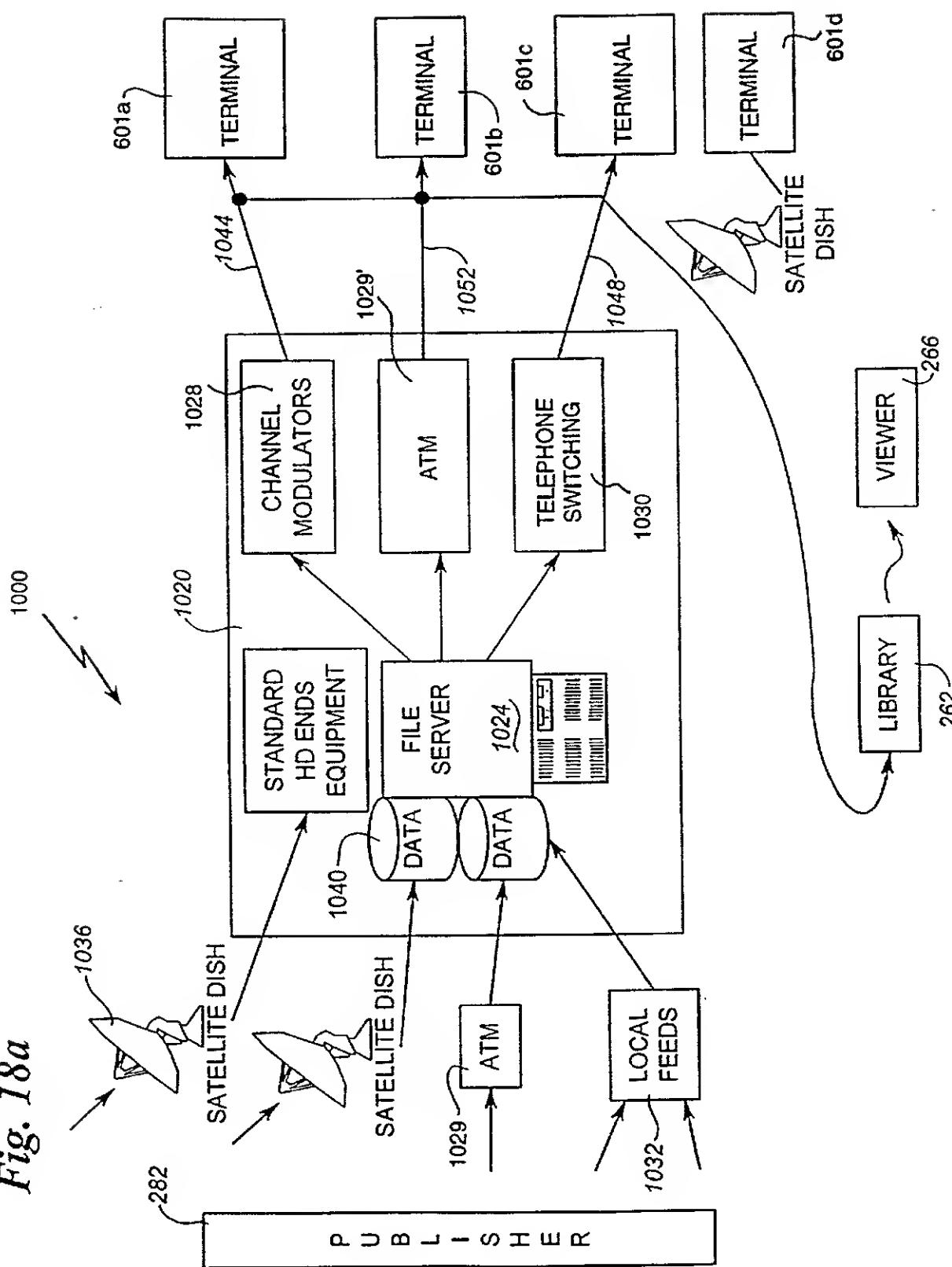
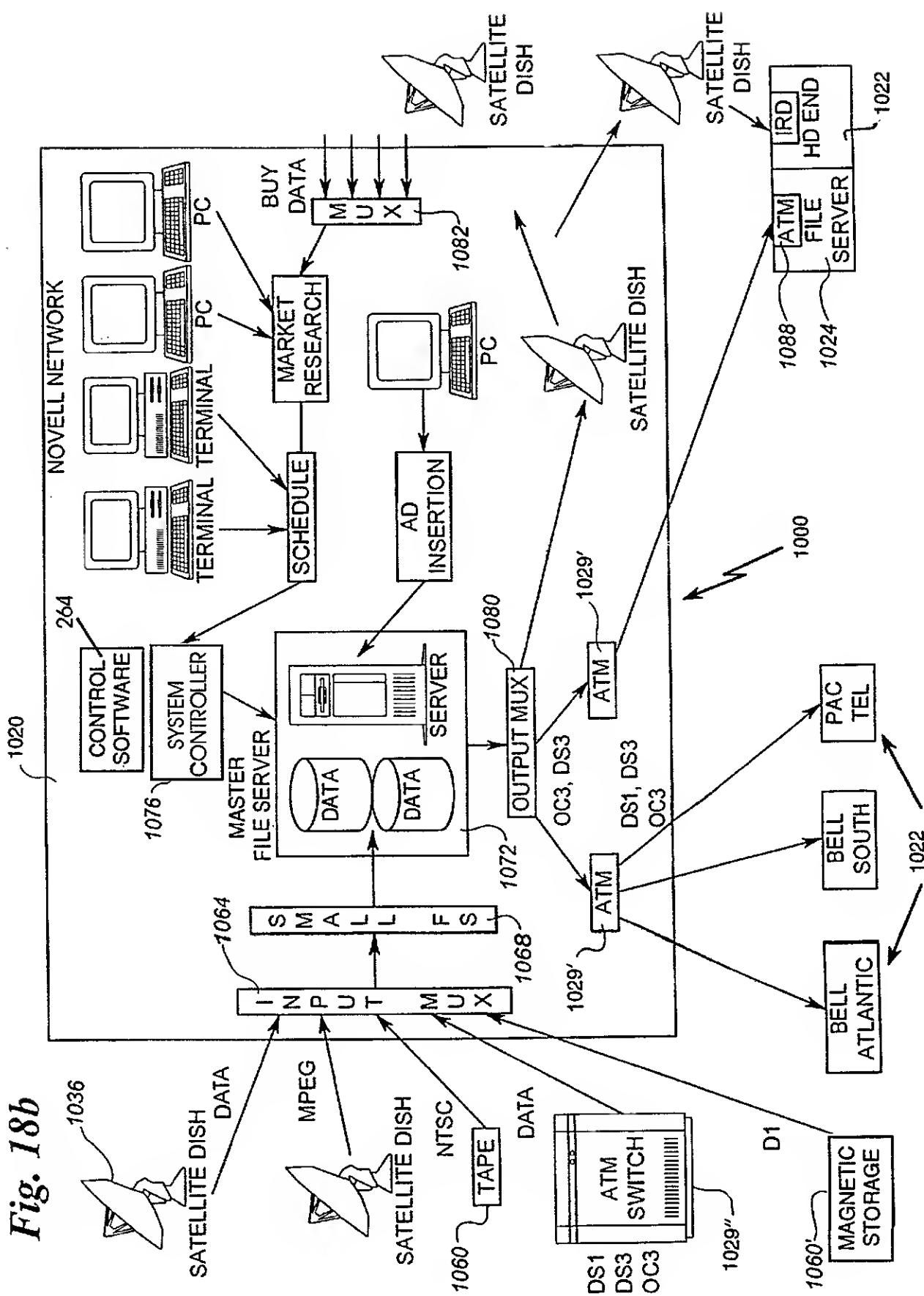


Fig. 18b



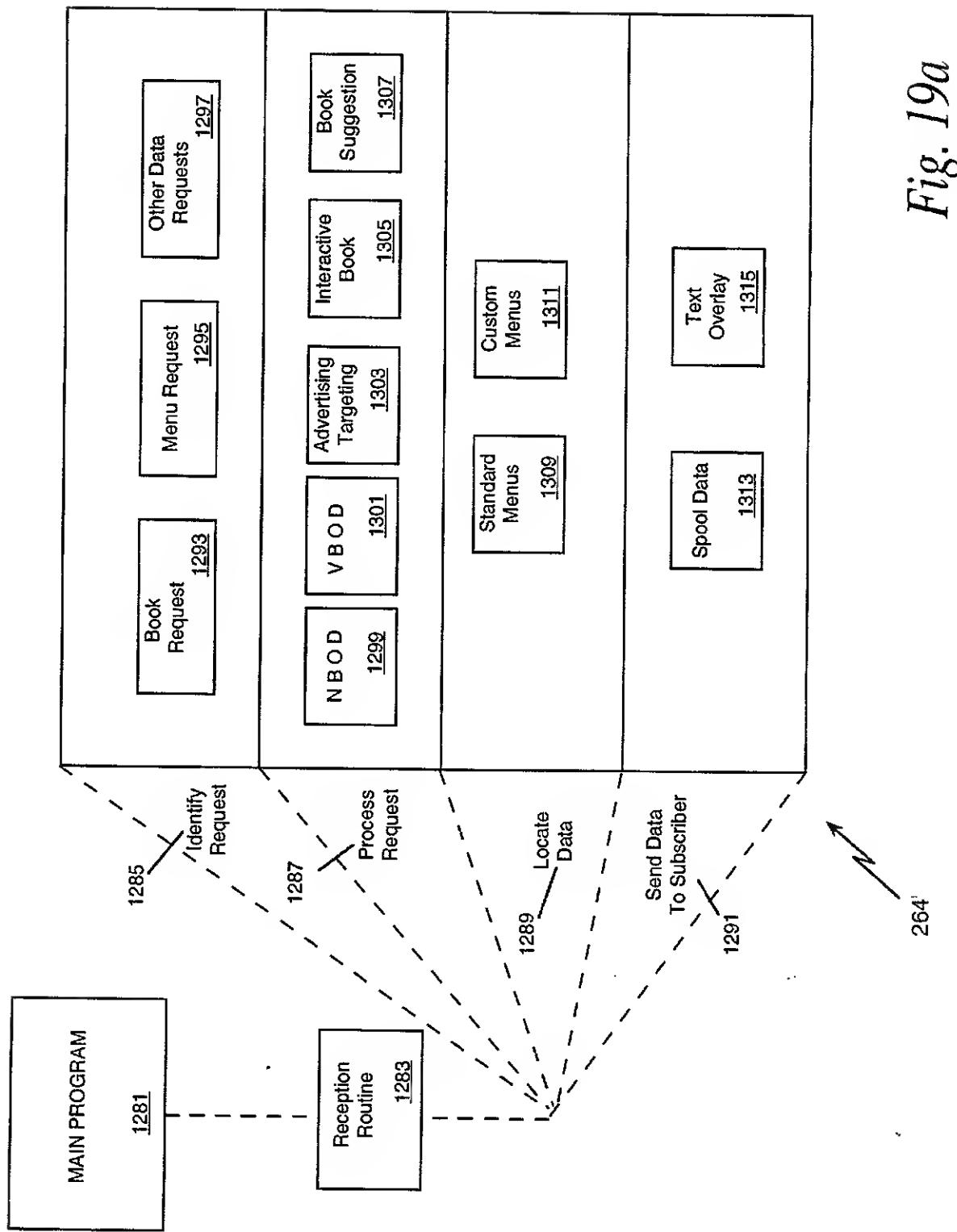


Fig. 19a

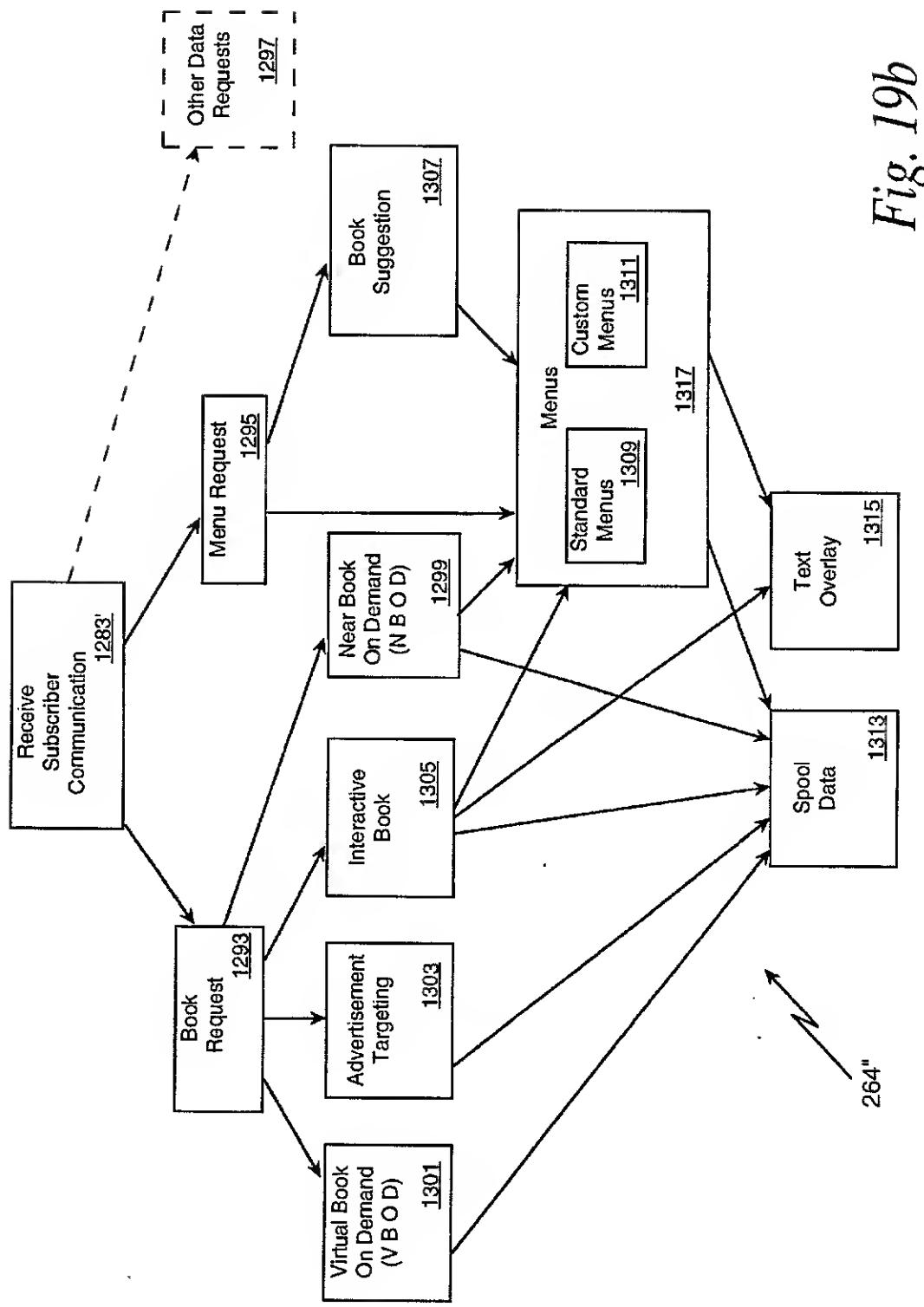
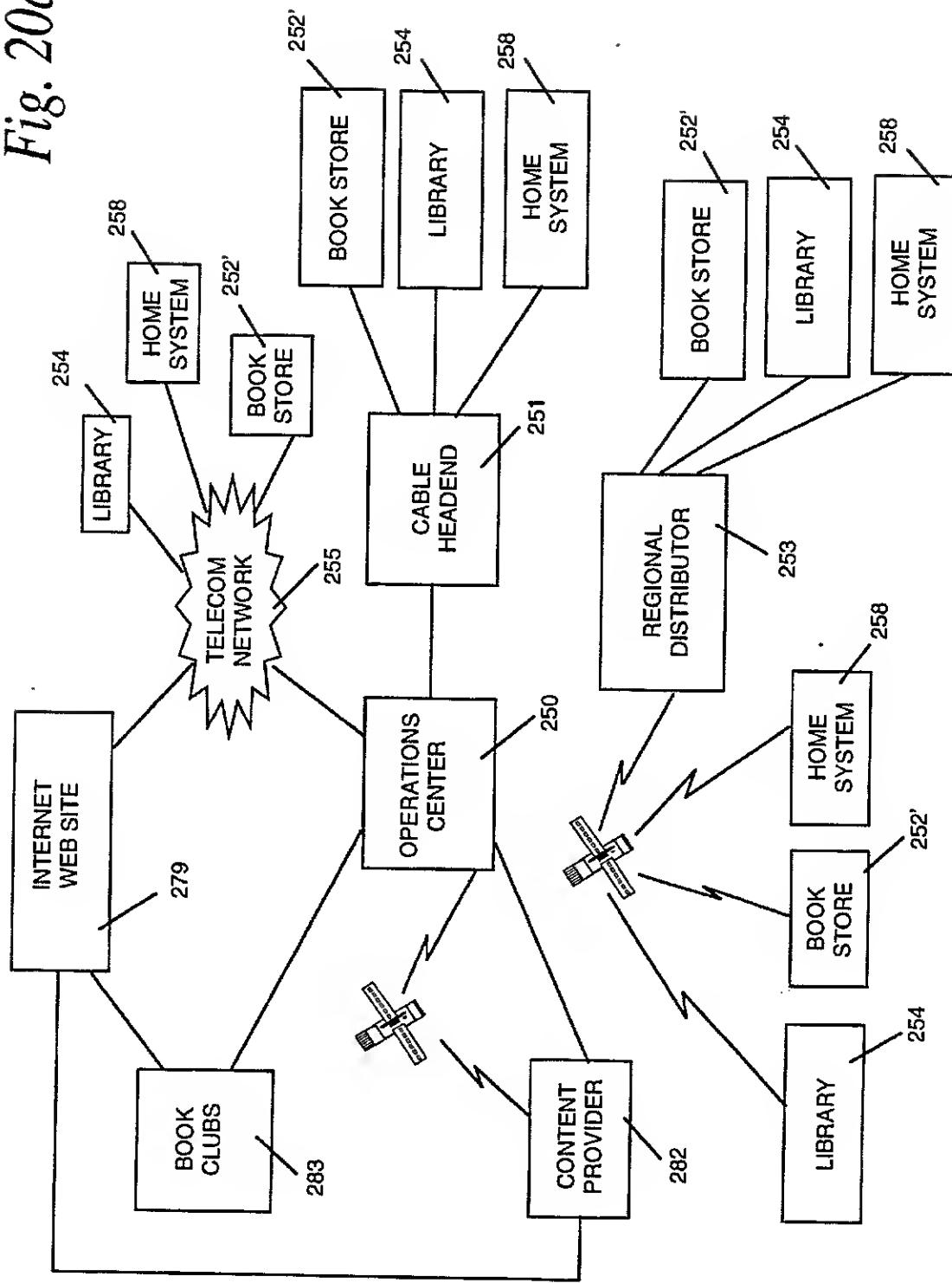
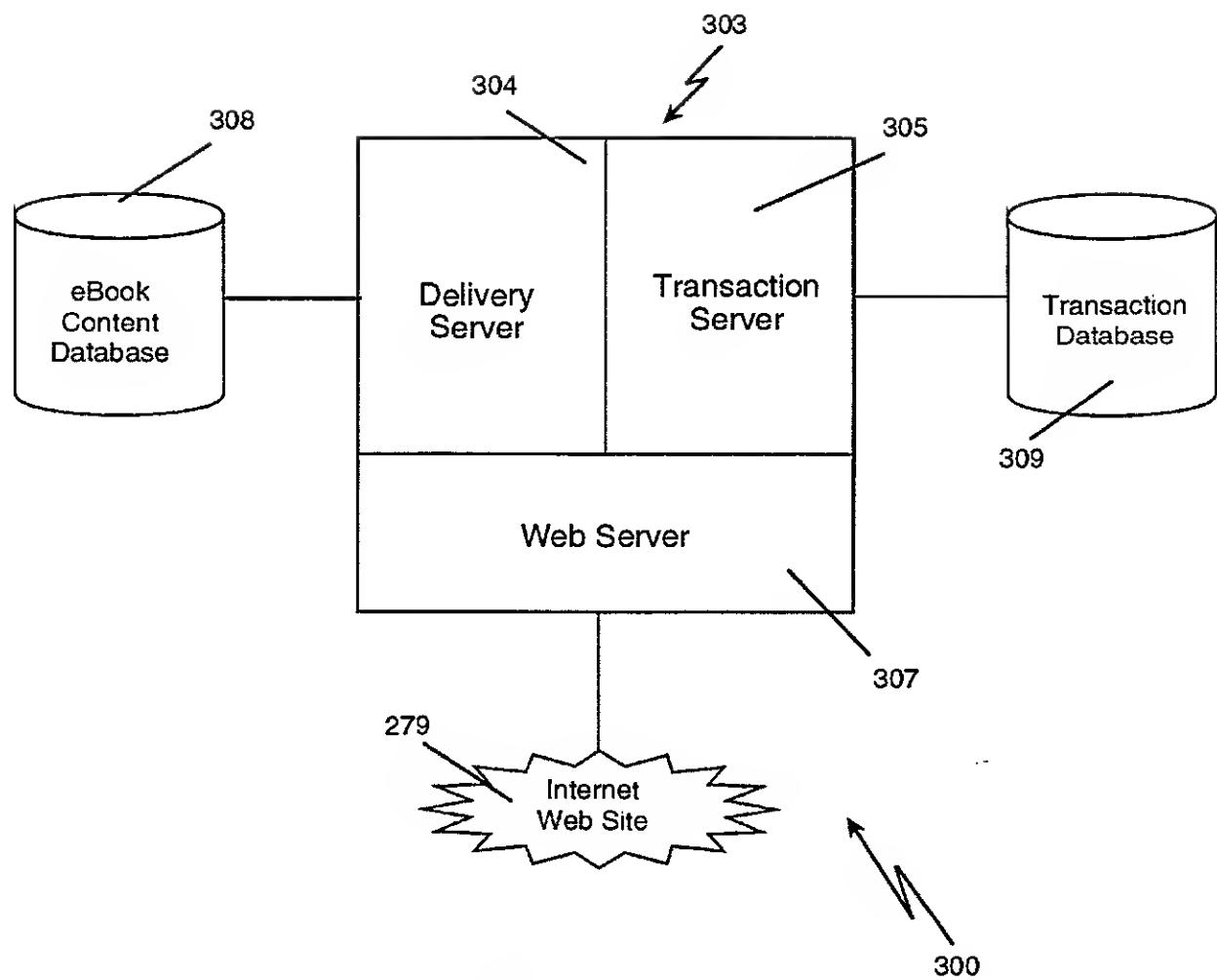


Fig. 19b

Fig. 20a





*Fig. 20b*

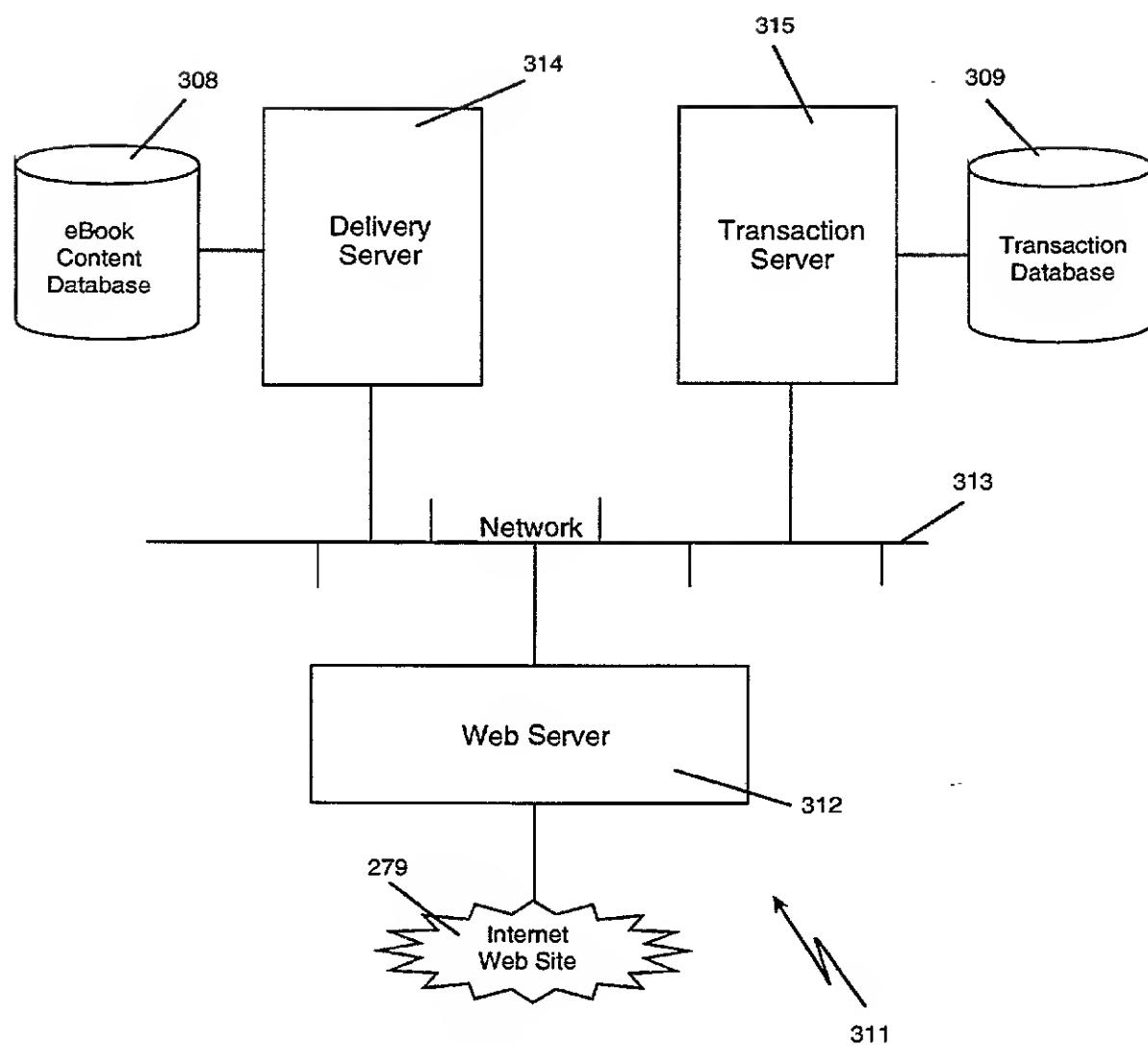


Fig. 20c

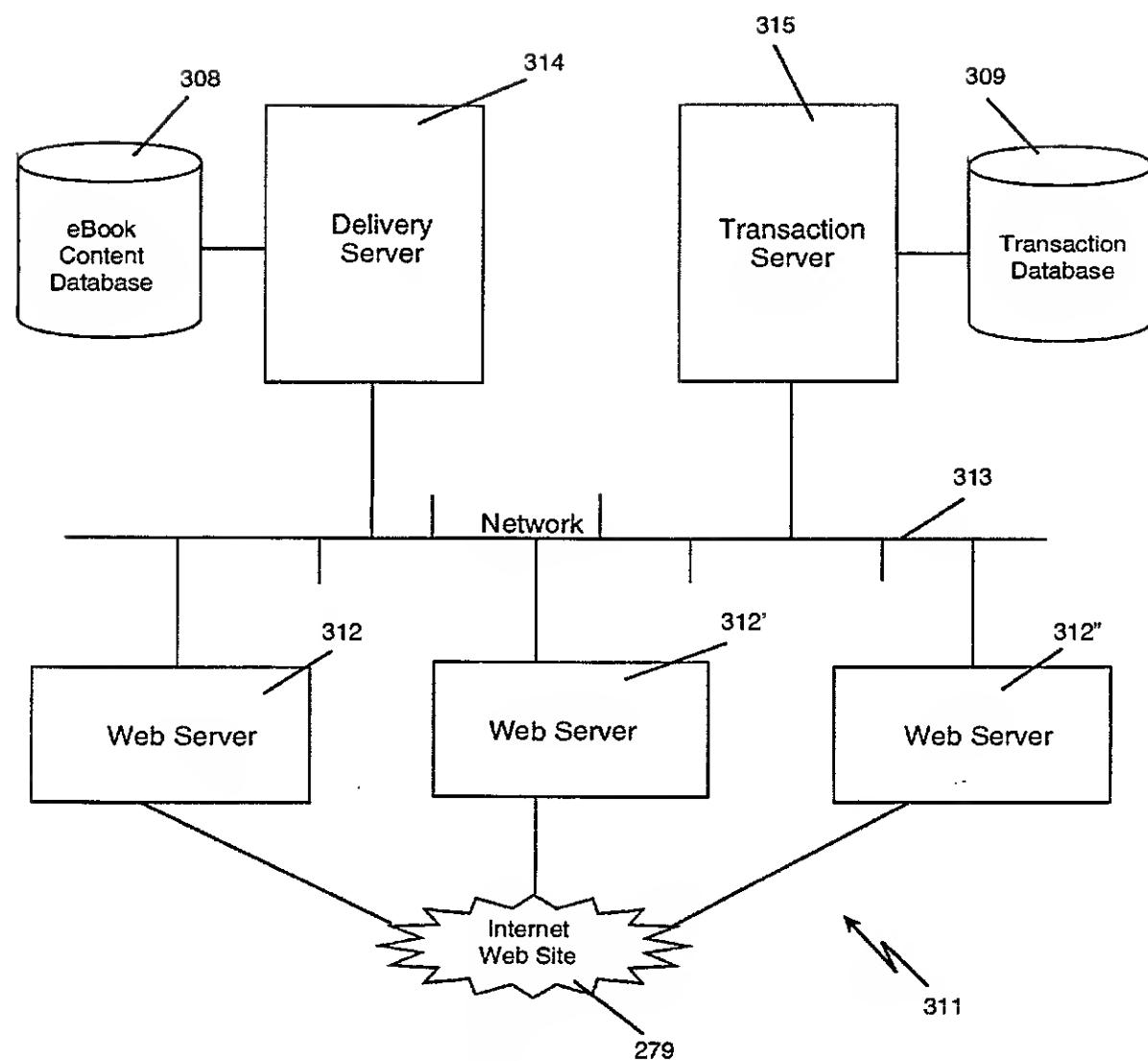


Fig. 20d

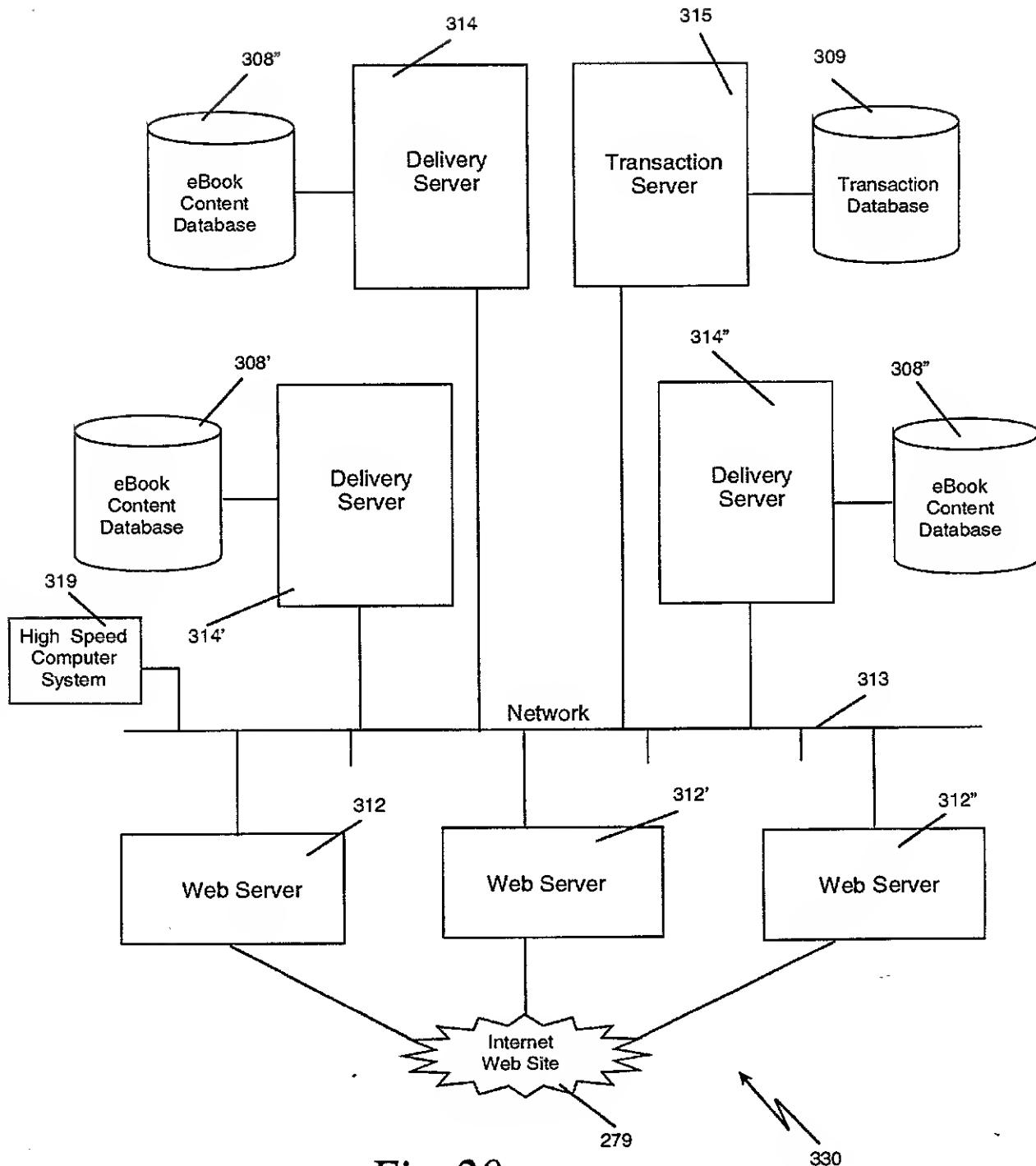


Fig. 20e

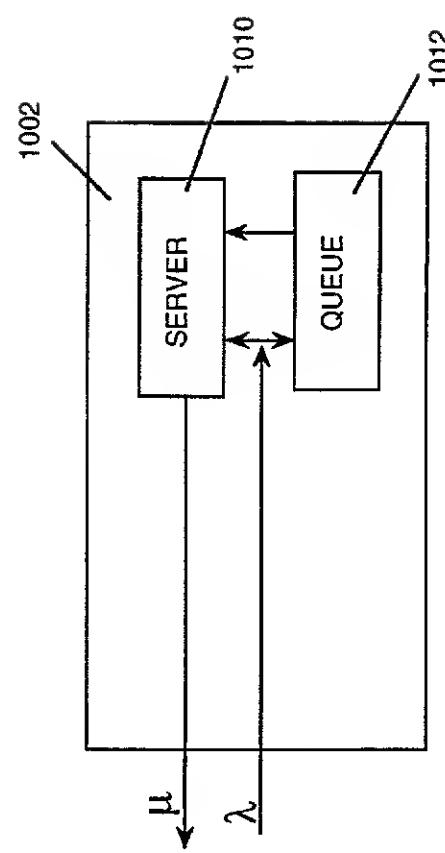


Fig. 21a

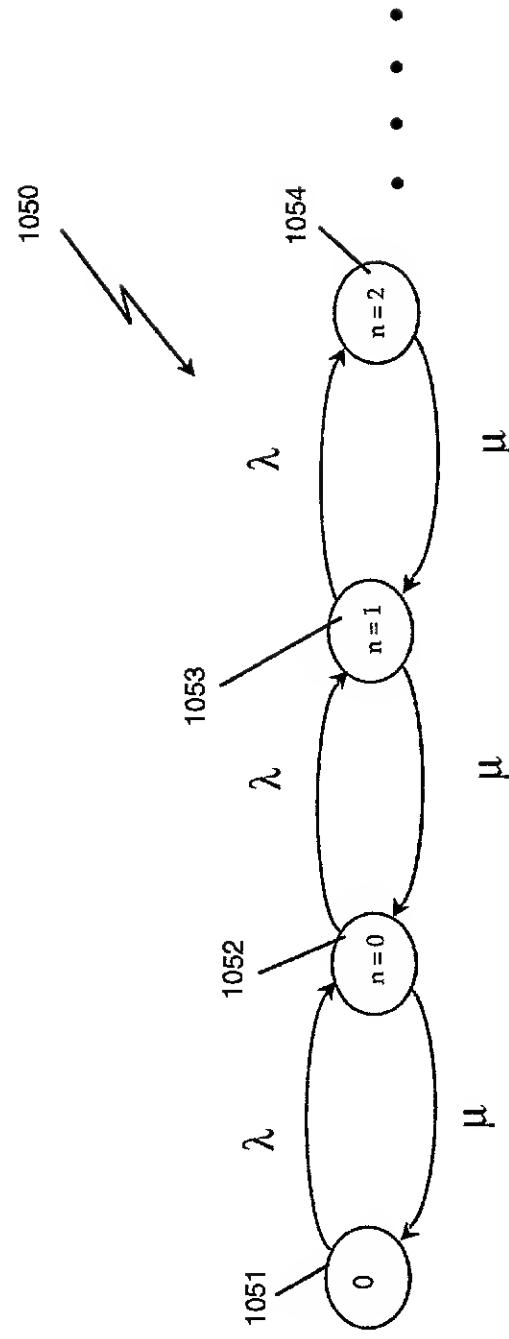


Fig. 21b

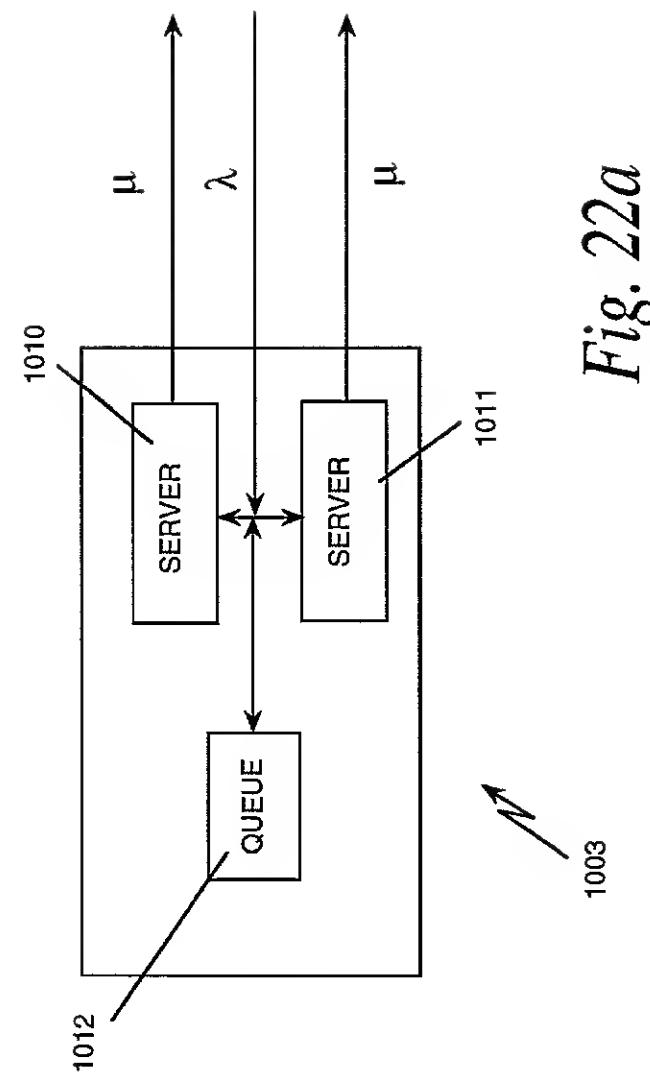


Fig. 22a

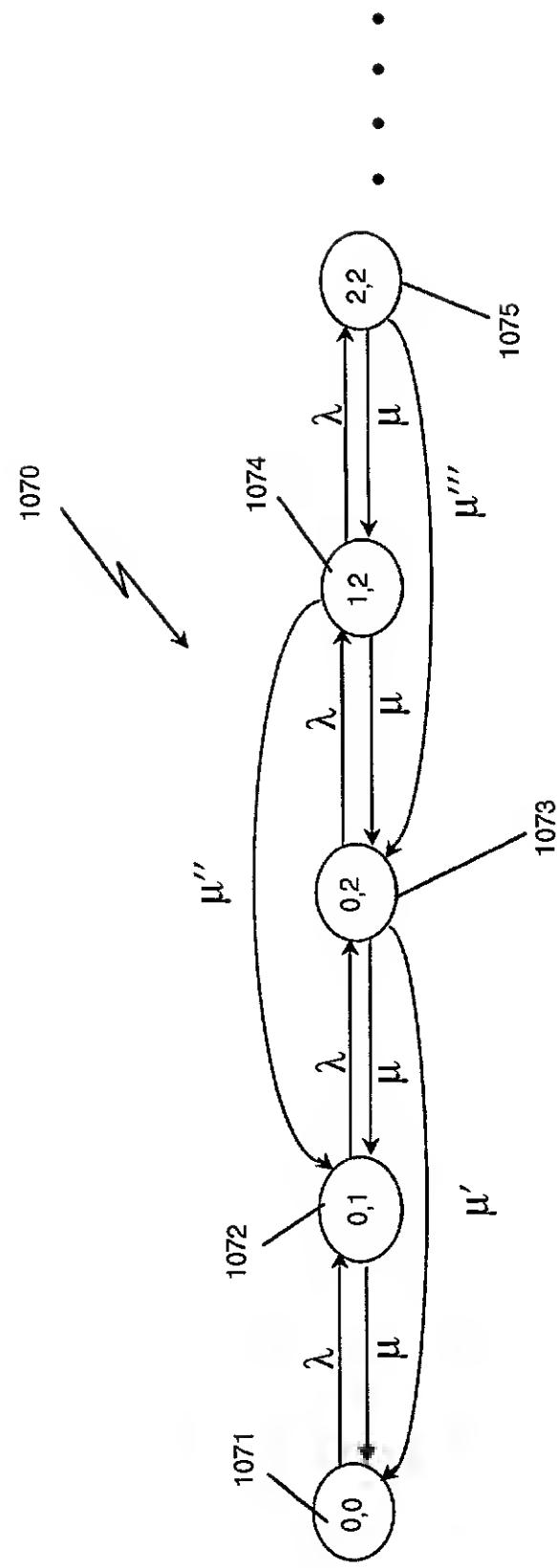


Fig. 22b

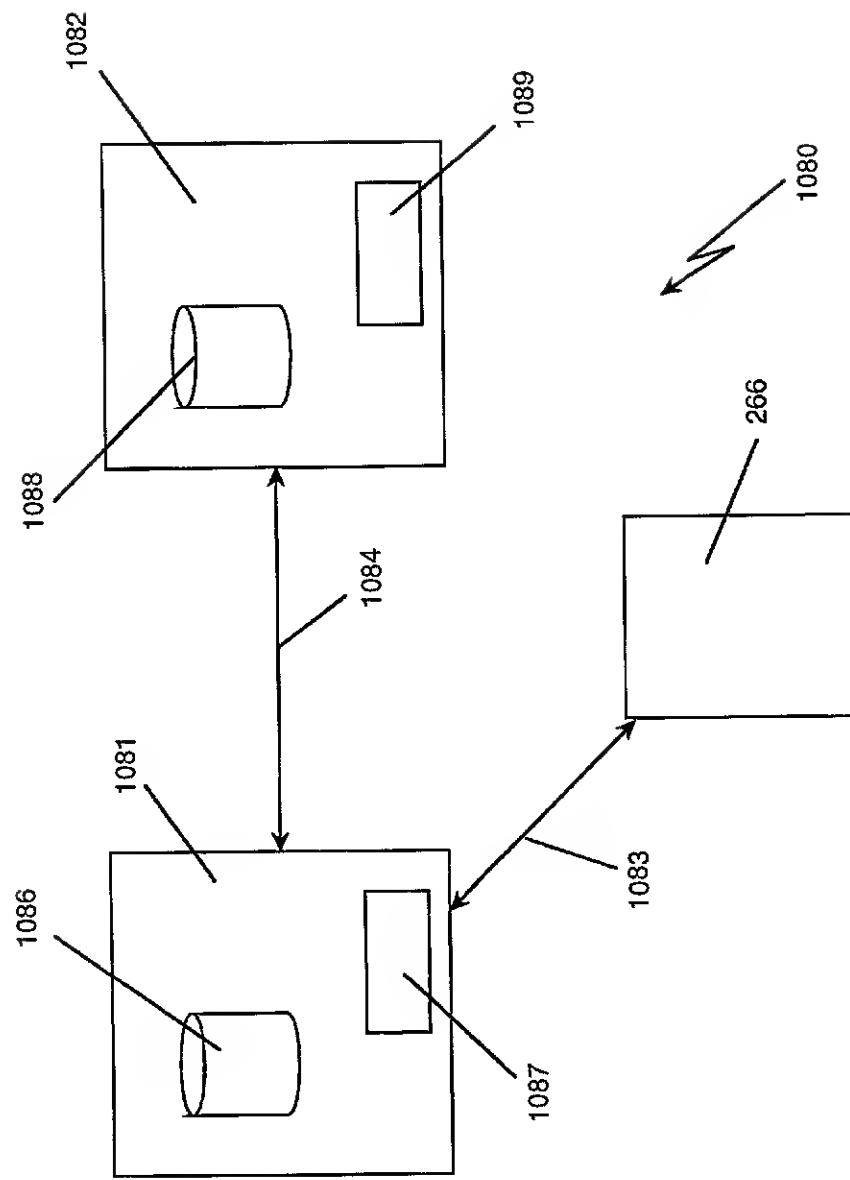


Fig. 23a

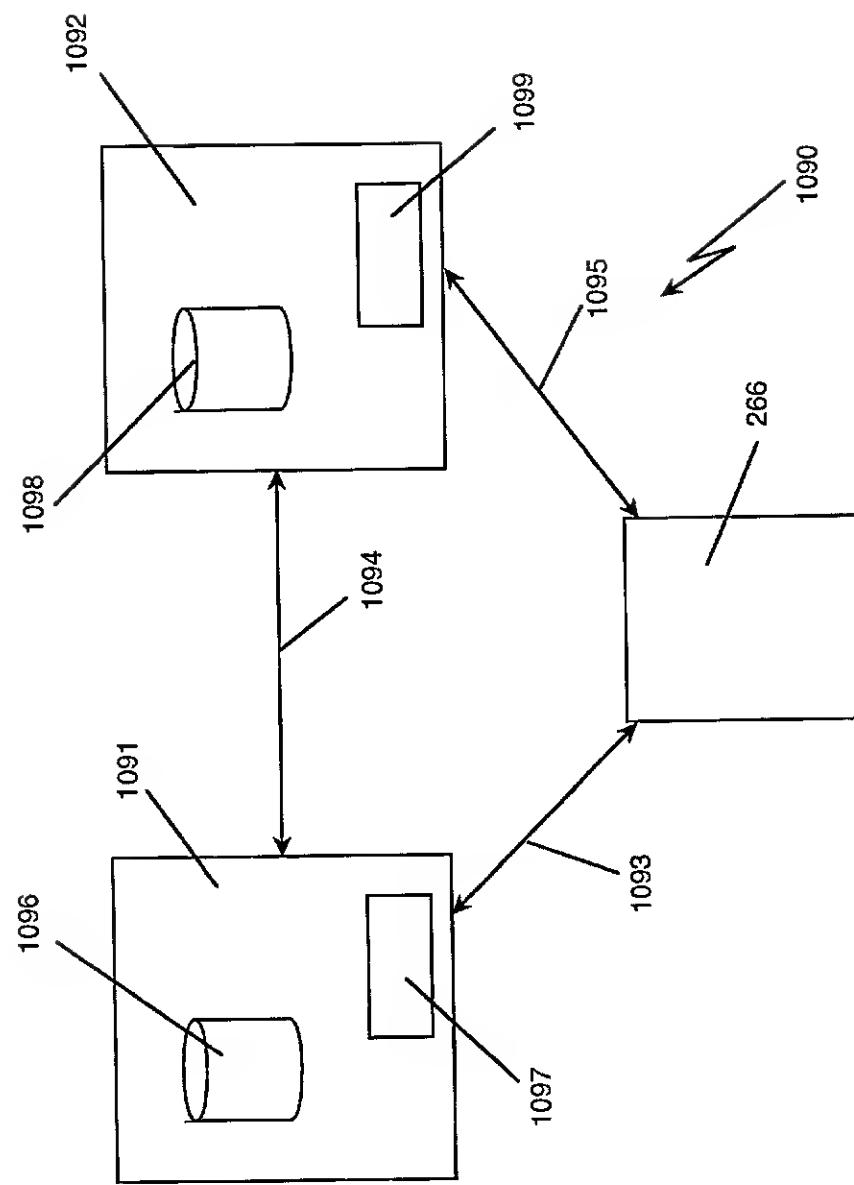


Fig. 23b

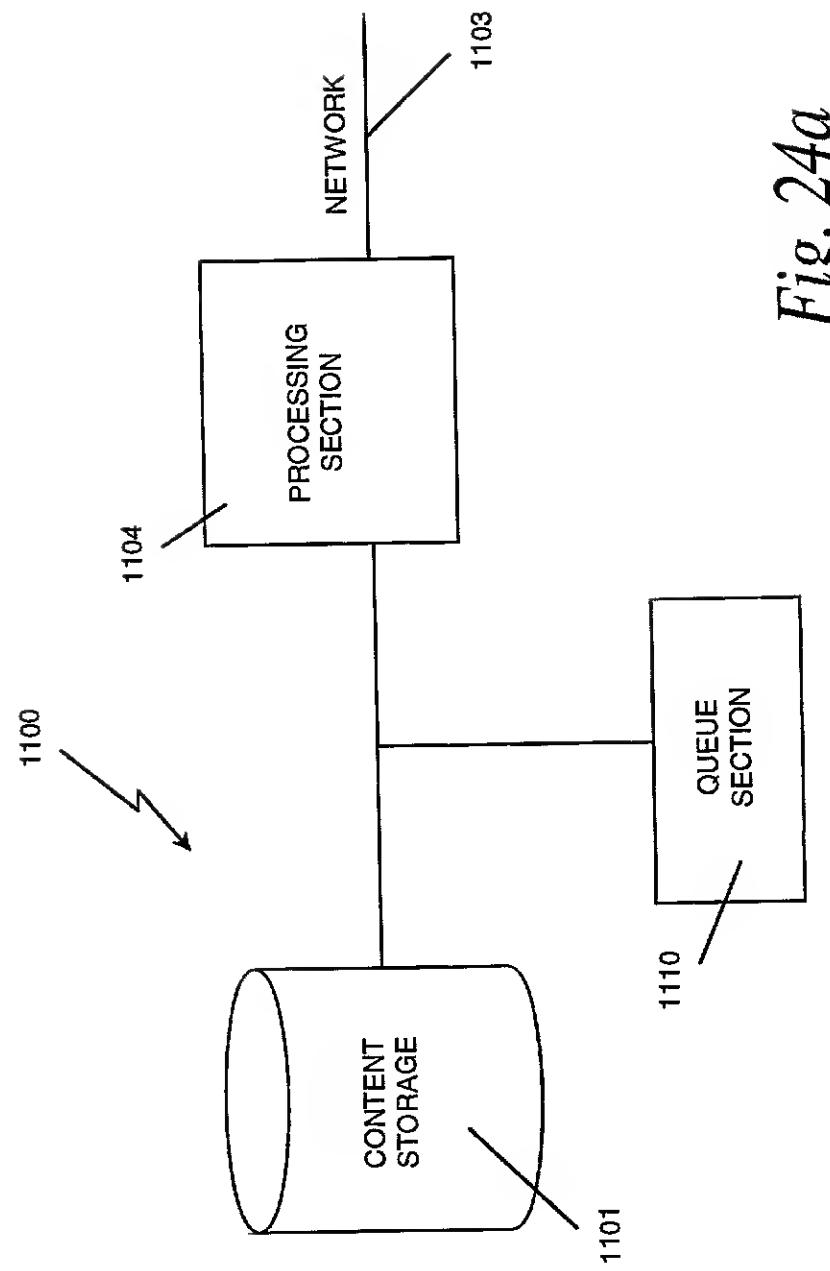


Fig. 24a

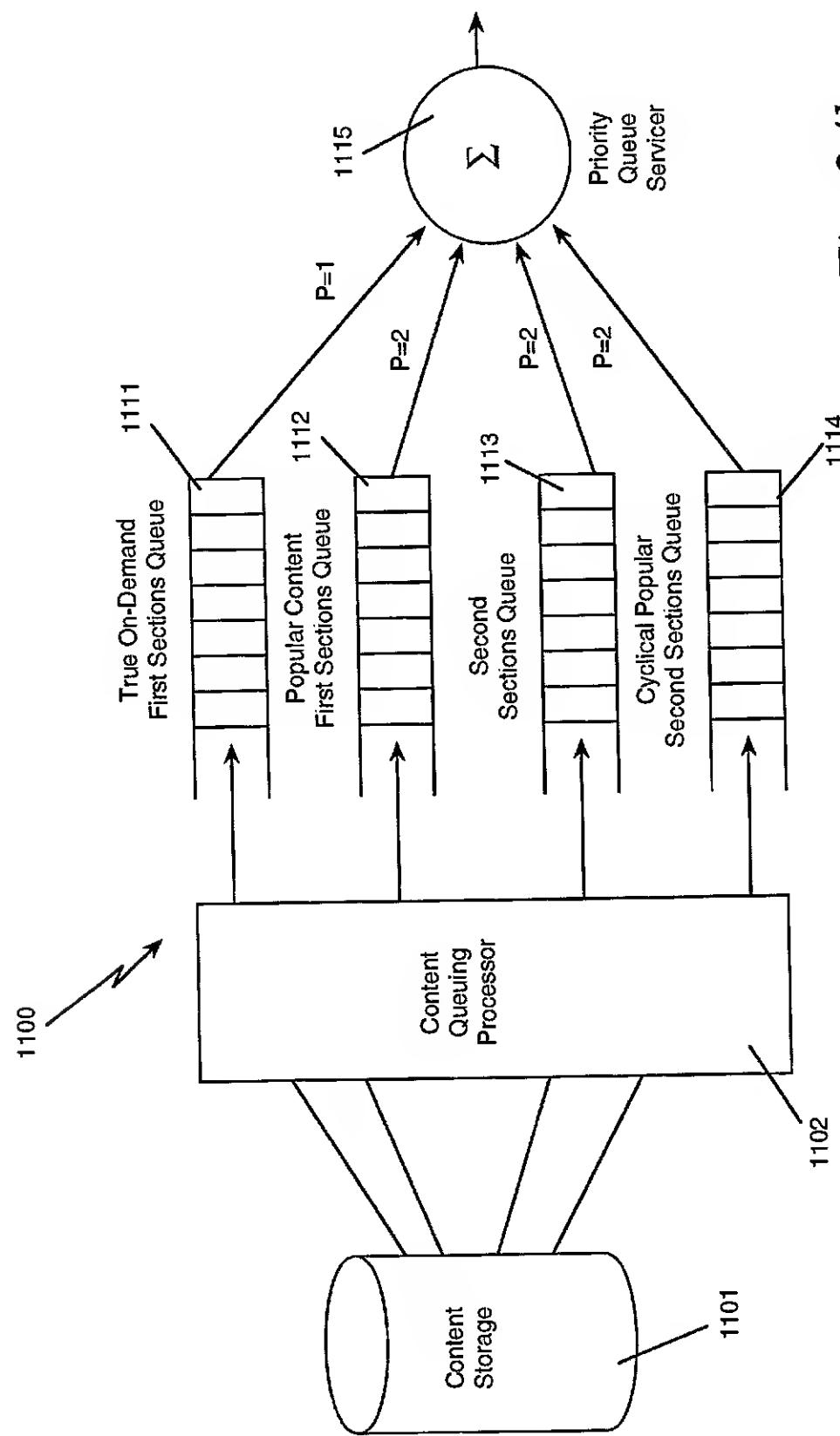
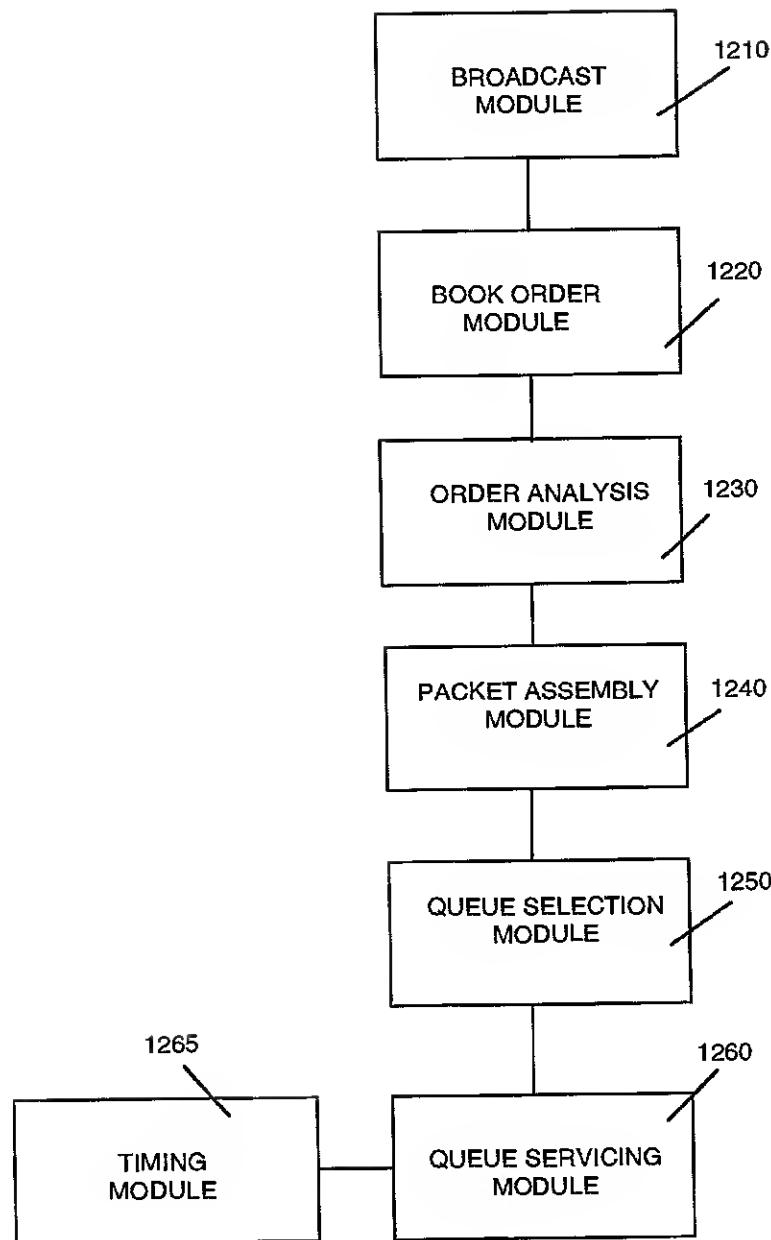
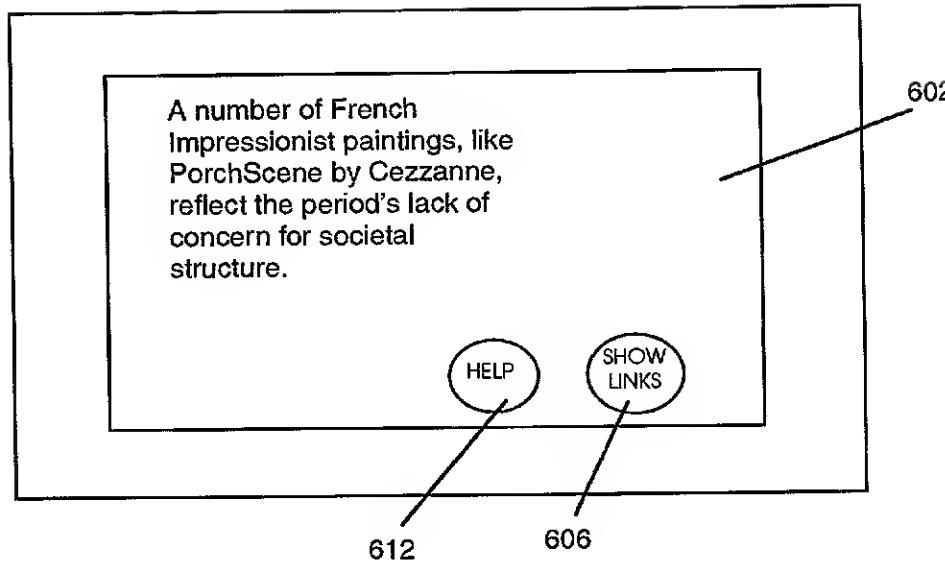


Fig. 24b



*Fig. 25*



*Fig. 26*

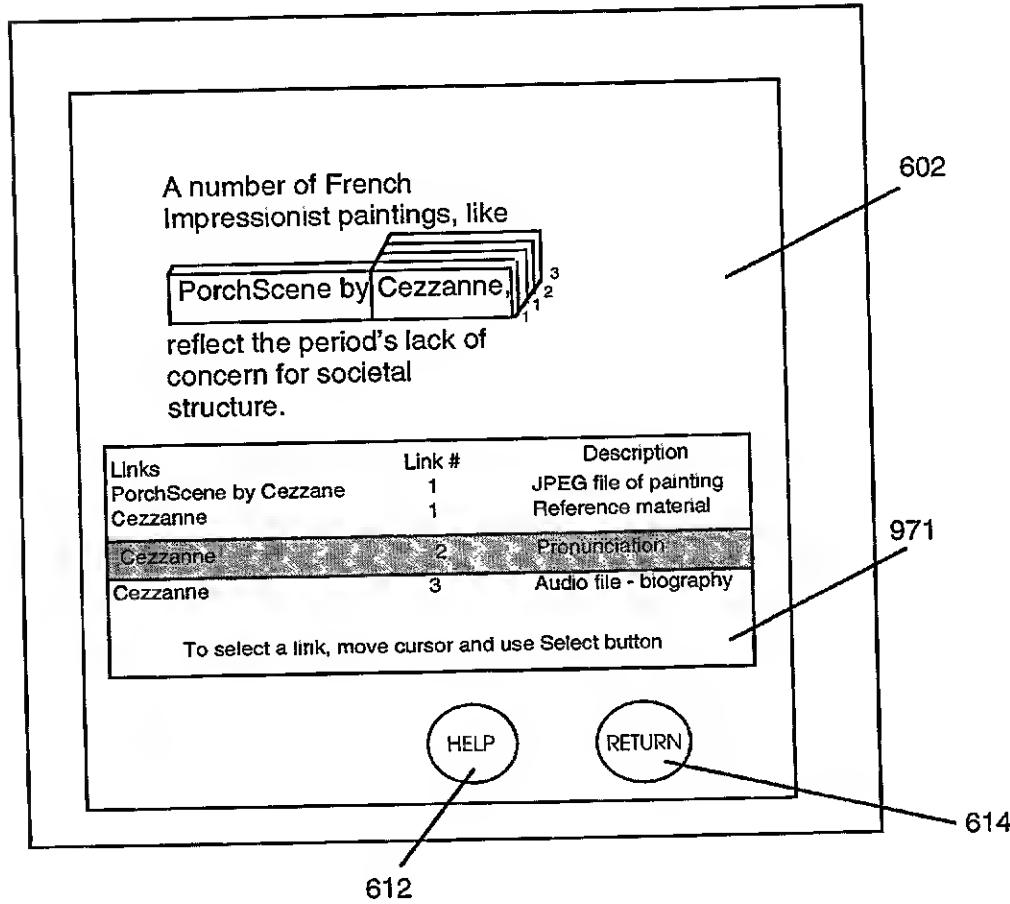
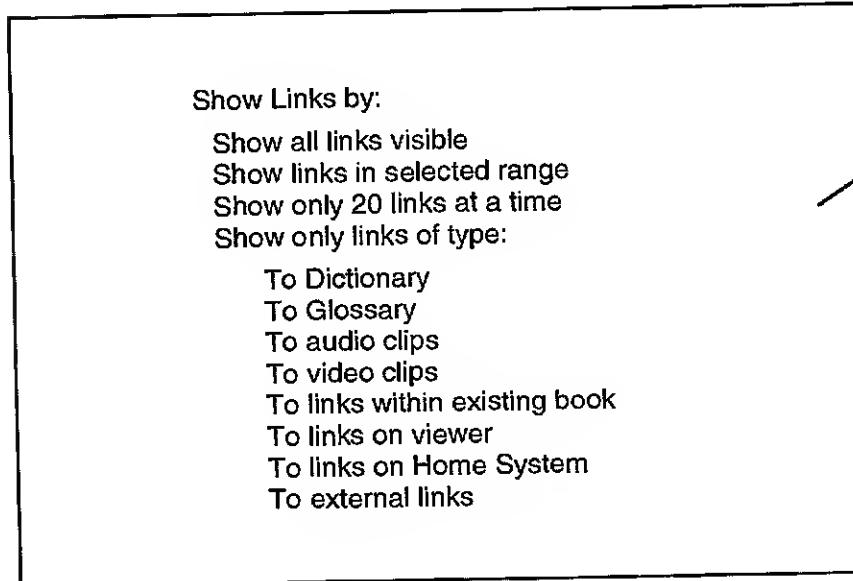
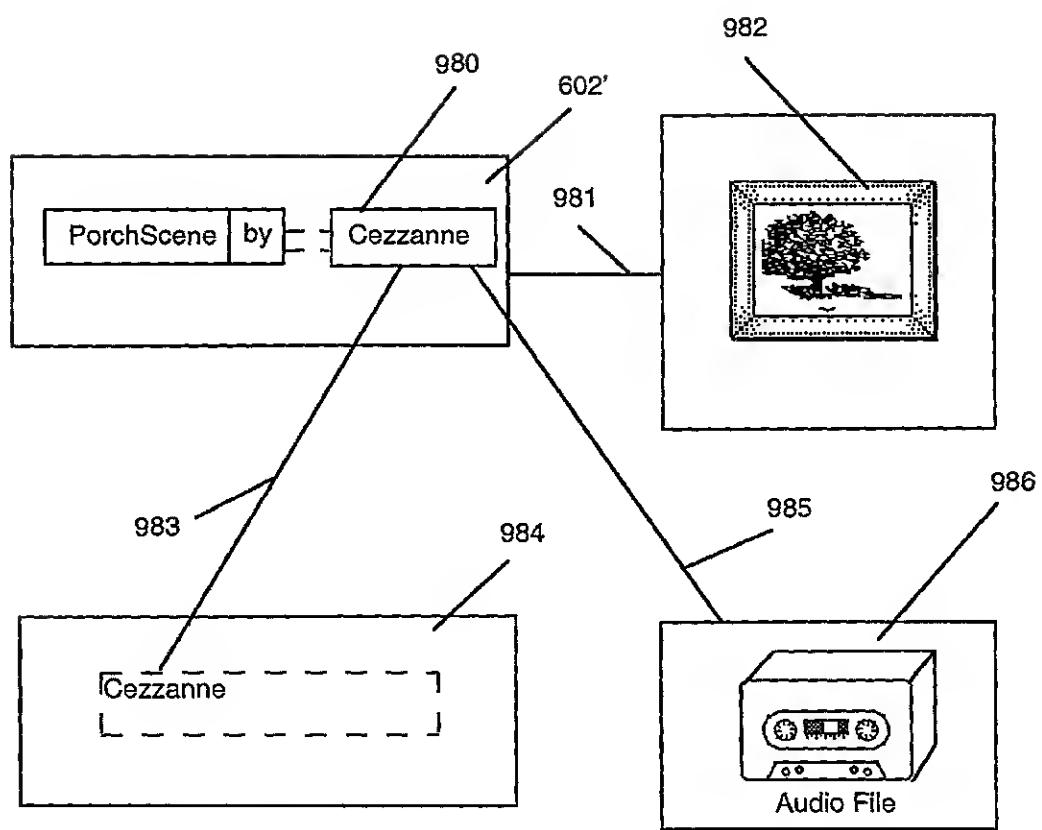


Fig. 27



*Fig. 28*



*Fig. 29*

Docket No.

5269

# Declaration and Power of Attorney For Patent Application

## English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

### VIRTUAL ON-DEMAND ELECTRONIC BOOK

the specification of which

(check one)

is attached hereto.

was filed on \_\_\_\_\_ as United States Application No. or PCT International Application Number \_\_\_\_\_

and was amended on \_\_\_\_\_  
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

### Prior Foreign Application(s)

Priority Not Claimed

(Number)	(Country)	(Day/Month/Year Filed)	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	<input type="checkbox"/>

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

08/160,281 (Application Serial No.)	December 2, 1993 (Filing Date)	patented (Status) (patented, pending, abandoned)
09/237,828 (Application Serial No.)	January 27, 1999 (Filing Date)	pending (Status) (patented, pending, abandoned)
09/237,827 (Application Serial No.)	January 27, 1999 (Filing Date)	pending (Status) (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

08/336,247	7 November 1994	pending
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
08/160,194	2 December 1993	pending
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
08/906,469	5 August 1997	pending
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

09/289,958 (Application Serial No.)	April 13, 1999 (Filing Date)	pending (Status) (patented, pending, abandoned)
09/289,957 (Application Serial No.)	April 13, 1999 (Filing Date)	pending (Status) (patented, pending, abandoned)
09/289,956 (Application Serial No.)	April 13, 1999 (Filing Date)	pending (Status) (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

**POWER OF ATTORNEY:** As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

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